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REPORT

OF THE

SELECT STANDING COMMITTEE

ON

AGRICULTURE AND COLONIZATION

THIRD SESSION, TENTH PARLIAMENT

1906-7

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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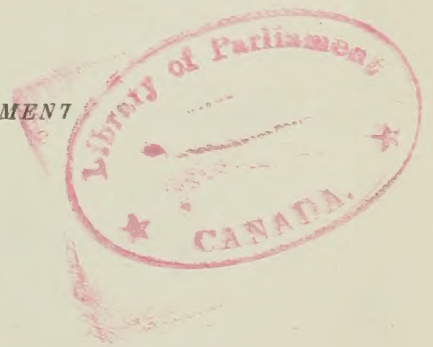


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THE COMMITTEE.

(P. H. McKENZIE, Esq., *Chairman.*)

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REPORT.

The Select Standing Committee on Agriculture and Colonization present their Seventh and Final Report, as follows:—

The Committee have had under investigation during the current Session of Parliament, the conditions of Agriculture in the Dominion, in relation to the several departments of agriculture, viz.: the Growing of Cereals, Root Crops, Fruits, and the Division of Dairying, upon each of which much valuable information to producers and dealers in the products of these respective divisions, has been taken in evidence, all of which form an essential part of this Report.

The evidence upon the growing of wheat demonstrates a steadily increasing area, year by year, brought under cultivation with highly satisfactory results to the cultivators, both as to acreage yield and the quality of the wheat produced. Each succeeding year reveals new fields in the great West, hitherto thought not to be adapted to wheat production. One remarkable instance of this occurs in the case of saline soils that for many years were deemed useless for the raising of wheat, and are now, by the application of tillage, found to produce splendid wheat both as to quality and quantity. This is given on the evidence of Mr. John Macoun, Naturalist, who, in 1906, made a minute exploration for report upon the soil, climatic conditions, and growing crops along the line of the Grand Trunk Pacific Railway, from Edmonton to Portage la Prairie, in which he states that he saw as heavy standing wheat crops, as he had ever before seen upon any soil, growing upon saline soils, once supposed to be unsuited for, if not altogether incapable of producing wheat.

Another extension of the wheat-growing area of the West is found in the higher northern latitudes now demonstrated to be capable of growing wheat more profitably, than was hitherto supposed possible. Mr. Thompson, M.P., produced before the Committee a sample of excellent hard wheat grown at 63 degrees north latitude in the Valley of the Yukon—this sample being from a third crop in succession, grown upon the same farm. Mr. Macoun, above-named, states on evidence that wheat can be grown in 61 degrees north latitude, and adds the further interesting fact, 'That whenever any production comes near its northern limit it produces more and its progeny seems to have greater strength.'

Mr. Elihu Stewart also states on evidence that in 1906 he saw a promising crop of wheat grown 550 miles north of Edmonton.

From the increasing discoveries during successive years, it is concluded that the actual wheat-growing area of Western Canada, is as yet, of undetermined measurement—any statements to the contrary being merely theoretical.

The Director of the Dominion Experimental Farms, furnished on evidence, the following comparative statements of the acreage yield of wheat as between the Canadian Provinces mentioned, and that of other leading wheat-producing countries of the world. In Great Britain the average wheat crop is 30·95 bushels per acre. In Ontario the average of winter wheat is 22·50, and of spring wheat 18·92, showing that we are not in this respect a great way behind the Mother Country; France averages 19·57 bushels, which is under the average yield for Ontario. Manitoba gives about 18·45, the Northwest of Canada 19·13, while Russia, in Europe, gives an average of 9·05 bushels per acre, and the United States 13·43. The Argentine Republic gives an average of 14·76 bushels per acre. Australasia as follows: New South Wales has an average of 9·9 bushels per acre; Victoria, 7·18 bushels; South Australia, 6·62 bushels; West Australia, 11·51; and Queensland, 15·77.

7 EDWARD VII., A. 1907

It is also in evidence that the settlers upon land are well pleased with the returns the soil yields for their labour, and happy in the enjoyment of the moral freedom they find in Canada, and ample protection secured to them for the safety of life and property. This is the case as expressed particularly by settlers from the continents of Europe and Asia.

The dairy industry is found to be also in a prosperous condition. The cheese branch has not very largely increased its exports last year, but the prices received in the markets of Great Britain were such that for about equal quantities exported in 1905 and 1906, for the latter year's export \$4,000,000 was received in excess of the export of the former year. It is satisfactory to note that Canadian cheese received in the British market, is regarded as second to that of no other country. This largely is due to the introduction of cool curing rooms as an adjunct to cheese factories, and the ample provision made for export in cold and cool storage. This provision for export has in the past year been extended to several products not so provided for in the past, and will doubtless be attended by corresponding results.

Owing to the provision made under agreement with the Government of Canada for the provision of ample cold storage for perishable products on railway and steamship lines, aided by cool curing rooms at factories, the dairy industry may now be regarded as settled upon a safe and permanent basis, conditional, however, upon manufacturers keeping up the standard of quality.

The Committee have had evidence before them in reference to the cultivation and export of fruits, particularly of apples, and it is found that the provision of cold storage in export, has materially enhanced the favour with which Canadian fruits are received in the United Kingdom and on the continent of Europe. This in turn has stimulated fruit-growers to greater care in selection and packing, in consequence of the better price thus received for their products. The protection to honest packers extended by the Fruit Marks Act, has led to more care as to quality on the part of sellers. By the evidence of the Chief of the Fruit Division of the Department of Agriculture, there is left over a large surplus yearly, of small fruit of the apple orchards that is not marketable owing to size, but which might be very profitably manufactured into excellent jam, jellies, &c.

Co-operation would probably convert this present loss into a profitable industry.

A careful survey of the entire field demonstrates that agriculture, the corner stone of national wealth and power, is in a more prosperous condition at present, in the Dominion of Canada, than in any other country of the world, whilst the yet unmeasured territory of rich virgin lands, awaits settlement, ready to respond bounteously to the industry and intelligence of many millions of willing hands. In a word, Canada is the world's great bread field of the day. Besides, no other country of the globe offers a larger measure of constitutional freedom and legal protection to her people, irrespective of social class conditions, or rank.

Another feature that augurs an enduring prosperity to agriculture in Canada, is the rapidity with which agricultural scientific training is being adopted as a branch of her national system of education, thereby placing the pursuit of agriculture on a par with the so-called learned professions.

P. H. MCKENZIE,
Chairman.

HOUSE OF COMMONS,
April 25, 1907.

EXPLORATION,---EDMONTON TO PORTAGE LA PRAIRIE.

HOUSE OF COMMONS,
COMMITTEE ROOM No. 34,
TUESDAY, December 18, 1906.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 o'clock a.m., Mr. McKenzie, chairman, presiding.

The CHAIRMAN.—Gentlemen, as you will see by the notice calling the meeting we have with us to-day Prof. John Macoun, Naturalist and Botanist, who has been engaged in the western part of our great Dominion during the past season and who will address us upon what he has seen there during that time. I have much pleasure in calling upon Prof. Macoun to address you.

Prof. JOHN MACOUN.—Mr. Chairman and Gentlemen,—Before entering upon a description of the country, permit me to make a remark or two in connection with the past. I want to say to you at the start that I am not a tyro in the examination of the country and therefore my statements to you to-day you can take, not perhaps as Gospel truth, but as scientific truth.

EXPLORATIONS PREVIOUS TO 1906.

When many of you, gentlemen, were much younger than you are now—34 years ago in fact—Mr. Sandford Fleming invited me to accompany him across the prairies when he made his great trip in 1872. On that occasion I acted as a botanist to his party. Next year my report of that trip was published and it was the first revelation of the possibilities of the Northwest. In 1875, I was invited by Dr. Selwyn to go with him to make an examination of British Columbia and the Peace River country, especially the latter, and Mr. Mackenzie, who was at that time Premier, appointed me to that expedition. I returned through the prairie country and afterwards made another report on the immense west. Again in 1877 Mr. Mackenzie, when he was pushing, as much as he could, the construction of a railway through to the west, asked me to write a report on the interior plains. I did so and it was published in the year 1877 in the Railway Report. Afterwards, when the new government came in under Sir John Macdonald, ten parties were fitted out in the spring of 1879 to go and examine the whole of the Northwest. I was invited to take charge of one party and made only slight objection. They sent me to the south and I came through this country (pointing to the map). I started from Winnipeg and went right through to the head of Long lake, then to the Saskatchewan, passed along here to the Hand hills, next south to the Blackfoot crossing, then up into the mountains by the Bow River pass, and then north to Edmonton, and eastward to Battleford and Winnipeg. My report of the journey in that one season did more than anything else to wake the people up. It set them on fire.

METHODS OF TRAVEL.

By an hon. Member:

Q. Would you tell us your mode of travel?

A. I was the first man that took iron-bound carts on to the prairie. The opinion up to that time was that an iron-bound cart used on the prairie would shrink up and

fall to pieces. When I reached Winnipeg a gentleman who was there yet and has charge of the Canadian Pacific Railway was selling carts to anybody who would buy them. I said: 'I will take them; they are the best carts that are going.' I took those carts and travelled with them 1,800 miles. Two of them especially went 2,500 miles that year, and I brought them back to Winnipeg perfectly sound and good. They were from London, Ont., and were the first iron-bound carts that were on the prairie.

By Mr. Jackson (Selkirk):

Q. What year was that?

A. That was in the year 1879.

By Mr. Barr:

Q. Crossing the sloughs would the carts sink?

Q. There were many persons who would get stuck in the sloughs because they had not the sense to do what we did. Whenever we came to a slough we put one wheel in the slough and the other on the hard ground and we got through without any trouble. This was when we travelled on a trail. When there was none we went around or crossed it boldly. We did that last year and we never stuck in a slough but once, although we travelled nearly a thousand miles last year with light wagons without roads.

By Mr. Staples:

Q. Why not have both wheels in the hard ground?

By Mr. Barr:

Q. If there was hard ground.

A. That is it, if there was hard ground. If not, you would get into a worse difficulty.

Q. How did you overcome the big sloughs?

A. In the early days we pulled the carts out by hitching a rope on to the tail of the horse. We took the horse through the slough and hitched its tail to a rope and the rope to the axle of the cart. Then two or three of us would get to work, and we would soon draw it out. We have done that repeatedly.

By Mr. Smith (Wentworth):

Q. That was pretty hard on the tail of the horse? Did you never pull the tail out?

A. No, we did not pull the tail out. I will not spend any time on this, but to show you the difficulties that had to be overcome.

The government instructed me, in 1879, to go up past the head of that lake, Long lake (indicating on the map). Before I started out from Fort Ellice, the Hudson Bay people said: 'You cannot go there; we do not go that way. Go by the foot of the lake.' I said: 'I must go there, because I am ordered to do so.' They brought out a guide, and he said that I could not go by the head of the lake, as there was no trail. I told them: 'I was instructed to do certain things, and I was going to perform them.' I asked: 'Am I going to submit my brains to that man? No, sir.' I had two surveyors, and we did our own guiding. Then I was instructed by the government to go here, elbow of South Saskatchewan (indicating on map). Now, to show you the fallacies that were prevalent long ago. This is the Qu'Appelle (pointing to the map). It was believed at that time that you could dig a canal from the Saskatchewan into the head of the Qu'Appelle. We measured it and found the distance to be 11½ miles. We also took the levels, and we found the Saskatchewan was 85 feet lower than the Qu'Appelle, and that settled the canal question. Then we went west and finally went up into the mountains, and it was late in the winter when we returned to Winnipeg. Upon returning to Ottawa, I saw Colonel Dennis. He was at that time Surveyor General and had a whole series of maps ready to be issued, showing 30,000 square

APPENDIX No. 4

miles of our grand Northwest to be part of the American desert—that is this section of country down here (indicating on the map). I said: 'There is no desert, it (Southern Saskatchewan and Alberta) is all fertile.' Colonel Dennis suppressed the map, and there are houses in this city that are lined with those maps on the inside as a substitute for felt. That was how 'the issuance of a map, showing a great part of the Canadian West to be desert land, was stopped in 1879. Then, in 1880, they said: 'Professor Macoun has got to go to the plains again.' This time, Col. Dennis took a map and placed a blue line on it and said. 'Macoun, you have got to follow that line.' The blue line started south of Brandon and passed through all the bad spots, as then understood. That year I travelled 1,800 miles, following the blue line, and discovered no desert.

THE EXPLORATION AND FINDINGS OF 1906.

Gentlemen, since that time we have learned more than was known then. With all the information that has since been obtained, I undertook my journey last year joyfully. Why? Because I said: 'Now I shall know whether my ideas of twenty-five years ago are right, and if they are not right, I will try and put them right.' When we went the first time, I had a nephew with me, and I directed my nephew every half hour on the journey to dig into the ground to the sub-soil, and we did that for over a thousand miles that season. There was much discussion as to the character of the soil, and some said it was this, that and the other thing. It was maintained by some that this country about Long lake (indicating on the map) was all gravel and of no use. The reason was, the men who examined the country had not the sense to know that the strong winds that blow over the prairie had blown away the fine particles of dust. Of course, where badgers had made holes in the ground, earth and gravel were thrown up, the lighter material being blown away and the gravel remained. Because of this, these wiseacres said: 'The whole country is gravel, and it is not fit for anything.'

Now we know that the Long Lake country is first-class. Well, as I say, on a former occasion we dug into the soil. This year we had nothing of that to do, and why? Because the people were on it and had cropped the land. I am giving you an account of the country now and am not guessing at it. I can tell you all I thought about the country before and all that I formerly said is nothing in comparison to the reality. There is a country that is nearly a thousand miles wide, and there is little of it that will not grow first-rate crops. It may be sandy, but it will produce crops. For nearly a thousand miles we have a country that is almost fit now for the plough going west and going north. We have a country 500 miles deep and we do not know it—we have not touched it yet. I left this point (indicating on the map), Portage la Prairie, on June 11, 1906, and we passed through Macgregor and Sydney and up on to the Big Plain north of Carberry.

The Grand Trunk Pacific passes through the centre of the plain about ten miles north of Carberry, and goes through a better country east of the Assiniboine than the Canadian Pacific Railway traverses, by a great deal. The former will pass through the centre of a first-class country, whereas the other line goes along the face of the sand-hills. Away back of the sand-hills the country ten miles north of Carberry is as fine a country as ever you looked at. Well, the line passes through this country nearly up to Birtle. It then descends into the valley of the Assiniboine. This point is Fort Ellice, and after we pass here the line begins to go up to the north. You will notice the points that I have marked on the map. This point is the Touchwood Hills post. All this section of country is pretty well settled. It consists of forest, prairie and sloughs and ponds. The country through which we passed this year from Hamiota up towards Yorkton and from Yorkton in the direction of (indicating on map) Beaver Hills and Touchwood Hills, is an exceedingly rich country, and the farms everywhere were first-class. The country was not like the prairie country where you could break

up 100 or 200 acres, or a square mile, without any interruption whatever. There was a lot of sloughs, growths of poplar, and clumps of willow, but everywhere the soil was good. Then when we come to the Touchwood Hills, do you notice the bend there, on the road. Now, it is about 25 miles from Touchwood to that point, but there was, as you can see, a difference. The prairie commenced about there, a little over 20 miles west of the Touchwood post. In the Touchwood and in the Beaver Hills, the country is not very much elevated, and the hills are not high, but as you go west the country begins to flatten out as it were, that is, the hills are less high and less high, and soon they are quite low; the fires from the west long ago seem to have cleaned off the trees, and before you reach the prairie you come to a district where the little undulations are beginning to pass away, and then you strike the prairie without a bush or tree; so that 25 miles west of Touchwood you strike the prairie.

You notice the bend there. That bend means that the engineers had to make a diversion in passing over. From this point to Saskatoon the road is straight because the country is level. You can stand on the line of the road and look as far as you can see toward the west, and turn around and look as far as you can see to the east, and there is not a variation of a foot; that road runs perfectly straight from here to Saskatoon.

By Mr. Martin (Queen's, P.E.I.):

Q. What distance is that?

A. It is about 125 miles.

Q. All prairie?

A. It is all prairie, until you come near Saskatoon. About here (indicating on map) 25 miles east, it begins to show clumps of wood and some pretty large trees, but it is most excellent land.

Q. Is the soil sandy?

A. No, not sandy, as we know it, but there is sand in the soil. I have the notes here to just speak about that. This point here (indicating on the map) is Manitou lake, Little Manitou lake, and this point here is a lake called Boulder lake. There are about four miles of boulders, so that it is very rough there. Little Manitou lake has a line of rocks about it. It is in a basin sunk in the prairie and has very salt water. These two points that I am speaking of, and they do not consist of more than 6 miles altogether, are the only spots in 125 miles that would not grow first class wheat. There is not an acre on the line of the road from here to Saskatoon that it not first-class soil except for these two boulder spots that I am speaking of.

Saline creek, the discharge of Quill lake, had the finest wheat fields on it that you could imagine, and yet it was all alkaline soil. Everybody told me that the land we used to call alkaline land, and that terrified people, when it was broken up and cultivated, produced the finest wheat in the whole country.

By Mr. Ross (Yale-Cariboo):

Q. Who owned that land before it was taken up?

A. I could not tell you that, I know nothing about that. There is a great deal of land through here that is not settled at all, there are only a few scattered people to be found across it, only an occasional settler.

Q. You did not understand my question? Is that some of the land that was alienated for the railway grants?

A. I do not think so, for the reason that I do not think it was considered worth having.

Q. The railways would not have it?

A. They would not have it.

That puts me in mind of a point just here that I will mention. Here is Long lake (indicating on map), at the time of the Queen's death I was at the court here, the Exchequer court, I was going to give evidence that this land was good. That was not many years ago. The railway was going through this land, they would not have

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this land here, they would not have it because it was, they said, all gravel and sand and in fact they were having a trial about it and I was asked to give evidence. I was going to give evidence that it was good, but the Queen died the day that we had the trial, and before the judges were reappointed and the thing was brought up again, some Americans taught them that the land was good, and since then they have been squabbling about it.

CROPS GROWN ON ALKALINE SOILS.

Our ideas change, my ideas about alkaline soil have changed, not in regard to the water, the water question is a difficult question. Now that point there is Saskatoon, and right there (indicating on map) about 25 miles to the east of Saskatoon there is a settlement that is only four years old which we passed through this year where there were hundreds of acres broken, and, as far as we could see, on both sides of the track there were fields of wheat as fine as any wheat we saw in the Carberry plain. As I said, the settlement is only four years old. Passing Saskatoon, and going west about ten miles, or less, on the line of the road we passed through the Smith settlement. I inquired if this was an old settlement, and they said, 'yes, we came here when the Temperance Colonization Settlement was established by Mr. Livingstone.' What I want to emphasize is that this is the oldest settlement that I know of in the West. It is nearly equally old with that at Carberry. In the Carberry settlement, when passing through it you would think they were all gentlemen. They have beautiful houses, with fine windbreaks and everything delightful around the place. When we got through to the Smith settlement, behold it was exactly the same. I said, 'Mr. Smith, when did you come here?' and he replied, 'Twenty-one years ago.' I said to myself, here is what the country is going to be 25 years after it is settled. That is what I saw. If the country had been newly settled I would have had doubts, and as this gentleman said to me just now, I would have said, 'there is sand here.' I say 'yes, there is sand.' There is a little sand in the land all the way from Little Manitou lake to far beyond Saskatoon and away to the west until you get pretty well to the Bare Hills and beyond. Here, there is a modicum of sand in the soil. I have written here what, with the permission of the chairman, I will put into my notes eventually what the settlers said of that tract. A gentleman who had been here some time and to whom I spoke, said to me, 'We consider that the sand instead of doing harm does good, and we have never missed a crop.' That gentleman had been there seven years. Mark, gentleman, he said that he had been there seven years and during that period he had never had a crop fail. His remark was, 'We have no drought, it never does us any harm, and we have no frost because our land is warm.'

By Mr. Staples:

Q. What is the subsoil?

A. It is clay.

Q. About how far down?

A. I do not mean that it is sandy, in the sense we would call it sandy; there is a modicum of sand. I will put it another way, it thickens as it goes down, in other words, it solidifies as it goes down. He said they never had any frost and the crops never fail.

Now, here was another thing I started out with, but I gave it up, when I saw how it turned out. At Portage la Prairie, I went to a farmer and said to him: 'Will you kindly give me the time that you sowed your wheat, and the time you cut it? I will ask you for it during the winter.' I did that all along, wherever I got a chance; nearly every day I would ask a farmer that question. But when I was here, east of Saskatoon (indicating on the map), I found the grain was getting hard; that was in the middle of July, and when I arrived at about 18 miles west of Saskatoon, close to that lake, on July 28, I found one field of wheat was fit to cut. Then I gave it up, because, as I went further west, I found that the grain ripened; I noticed lots of

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fields of wheat from August 4 to 12, and on August 18 I found the grain in stacks, so that I gave up asking, because my intention to compare the ripening of the crops in the West with the ripening in the East was of no use. I had seen enough to satisfy me that the ripening in the West was, for this year anyway, not different from that in the East at all.

By Mr. Jackson (Selkirk):

Q. Were you finding out from the people, at the same time, how many crops they had taken off that land, whether it was two or ten or twenty, because, if you did not, the information would not be of such great value?

A. I did not, for this reason, that the oldest settler I spoke to in the interior of the country was that man who had been there for seven years, the man in the Smith settlement, where I talked the matter over, said their crops were exceptionally good.

Q. You did not find out either whether this land was summer fallowed or not?

A. Well, sometimes it is. That is another peculiarity: the summer-fallowed land had the poorest crop this year, because the spring was very cold. The wheat grew at first like a hothouse plant, and then it got chilled by cold, sleety rain, and it did not do nearly so well as it did on the stubble.

Q. I consider your opinion, to have been of any use, should have added to it how many years that particular field had been cropped.

A. Yes, but I can go further. Let me test my statement now. It is a broad one, but I challenge contradiction to it. The people do not realize yet that we have scarcely any running water in the Northwest, and where there is no running water, there is no leaching of the land. The land of our Northwest is practically inexhaustible on that account. Please let that pass into your mind as absolutely true.

Q. How about the Saskatchewan river and the Assiniboine, and the country which they drain?

A. There are no creeks that run into them.

Q. Are there no creeks running into them?

A. No, that is absolutely the fact.

Q. Are you aware there is one running into the Saskatchewan river near Battleford?

A. Yes. I can tell you of Eagle creek and Eyebrow creek and others, but the water that runs into them you can carry in a few pails.

Q. Are you not aware there is a creek that runs into Quill lake?

A. Certainly.

Q. There are streams running into them?

A. Yes. Excuse me, but there is nothing like making things clear. There is Big Quill lake (pointing to the map) and the smaller lake, but the water is quite salt; it is of a saline character.

Now, in this country from this point (indicating on the map) to Saskatoon, an area of nearly a hundred miles, there is no creek at all; but, gentlemen, there is a good rainfall. You may ask where does the water go? I asked that question of Senator Perley. We talk these things over pretty often, and I asked him, 'Where does the water go?' It passes for a certain distance down into the soil, and eventually it evaporates. The point I wanted to make is that as long as there is no leaching there is no loss except what the crop takes from the soil.

By Mr. McCraney:

Q. What would you say regarding the effect of burning straw? I have always believed that eventually it would tend to the depletion of the land?

A. I do not think it will. Senator Perley asked me on one occasion in my office how I considered the men in the West could keep their land up to a proper tilth—in other words, so maintain it that it would perpetually produce crops. He said, 'I want to leave that land as God has given it to me.' I told him, 'You are going to leave it that way if you are careful.' There is no leaching, and a slight rotation of the crops

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will keep the land in good condition. As long as there is no leaching your land is practically like the land in Egypt. There is an idea prevalent that the water of Egypt going on the land contains a whole lot of nutritious elements, and therefore it is beneficial to have it passing over the land. It is not so. It is like any other water going over the land. The land that is only slightly irrigated will never become poor. The land has never failed in California, and there is no talk about fertilizers. I told Mr. Pearce, 'If you begin to irrigate in the fields at Bow, as foolish persons have done in British Columbia——

By Mr. Ross (Yale-Cariboo):

Q. I beg your pardon.

A. I beg to correct that statement: As I have seen them do in British Columbia.

SALT STREAMS, OUTLETS OF SOME LAKES.

By Mr. McIntyre (Strathcona):

Q. Is it not a common thing to find the outlet of the lake salty?

A. Quill lake and Manitou lake are the only two lakes that I know of that have salt water streams flowing from them.

By Mr. Derbyshire:

Q. What do you drink up there with that salty water?

A. Real lime juice.

By Mr. Jackson (Selkirk):

Q. I understood you to say that Quill lake and another lake you mentioned were the only salt lakes?

A. There are several big lakes of that kind.

Q. All salty?

A. All salty.

By Mr. McCraney:

Q. About range 24 there is a salt lake?

A. You mean this one? (indicating on the map). Yes, that is a salt lake, too.

By Mr. Lake:

Q. It is alkaline, is it not?

A. We call them salt lakes, but the rock that they are based upon contains a large quantity of magnesia—really Epsom salts. Most of them are just salt and contain a very great solution of Epsom salts, and you know the results. I may say this, and gentlemen who have travelled in the West know it: In the spring, when the rains are taking place, the waters are so diluted that you could drink them without injury; but in August and September, when the rains have ceased and you try the waters in the same lakes, you find that they are not so good. Now, a gentleman asked me how we drink that water. We drink it with great quantities of lime juice, which renders it quite palatable.

By Mr. Derbyshire:

Q. Not with a little good Scotch?—A. No. The lime juice put into the water makes it very good. I drank it all last summer with lime juice and a little sugar. We use that in any kind of water.

PIONEER SETTLEMENT,—THE FIRST HOUSE,—A NOVEL FUEL.

Now, gentlemen, I want to proceed a little further. This is Eagle creek, and this is Battle river. We crossed through what is called the Bare Hills. There is no bush there and no woods. We camped on this spot, and the engineers told us there

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was no wood within 35 miles. There is not a bush in this country at all, only a few willows along a salt lake, that we call White Shore lake on the map. The whole of the waters here are more or less salt. This is a pretty dry country. We passed through quite a large section here of first-class land. The soil is first-class, but it gets drier as you go west. You would think it was pretty hard where there is no water and wood is scarce, and yet the American settlers have no difficulty whatever in establishing themselves in this country. Why? Because they have been accustomed to this kind of thing on the other side. The American comes in, and the first thing he does, he looks around and he says: 'I guess we will see if we cannot get water.' He hunts for a well, and if he gets water, he builds a house. And how does he get his house? He gets into a little hollow and, after satisfying himself as to the situation, he cuts the sod about three inches deep, turns it over and divides it in sections and builds a sod house. These sod houses throughout the West are first class. Men of this kind establish themselves in no time by going right about it. That is the whole question. I said to a gentleman: 'Could you not use the sod here for fuel?' He said: 'Of course, we do.' I thought I was going to enlighten him, but he would not be enlightened on that point, he had been enlightened before. There is no difficulty about settling in a place where there are five or six inches of sod and breaking it up, turning it up to the sun and letting it dry and having first-class fires. Anybody could do it, if they would. The whole question, gentlemen, is between capacity and incapacity. The men coming from the United States are capable people. Some of the Ontario settlers, but not all, are also capable people.

By Mr. Wilson (Lennox and Addington):

Q. Are there many native Americans coming in?

A. A great number. It is a curious fact, though, that many of them were formerly Canadians.

Q. Is there a large foreign element coming in from the United States?

A. I never saw a foreigner at all. They were all English-speaking people, and apparently native Americans, or had been, as some one told me, resident in the United States for twenty-five or thirty years.

Q. Were there any Germans?

A. No, I saw no Germans.

By Mr. Jackson (Selkirk):

Q. What about the Galicians?

A. I have not time to speak about the Galicians this morning. I would say this, however, that the Galicians are a hard-working people, but they cannot talk to you. It is a difficult thing in a new country, where there are no roads, when you run up against a foreigner, and you say to him: 'Is this the way?' and he answers 'Yes.' You follow it, and you discover it is not the way. The Galicians, as workers, are all right and are a decent, civilized people.

COMPARATIVE ELEVATIONS.

Here is the most difficult section in the whole country. This is what is called Big Manitou lake. This creek that you see runs into Manitou lake. And here I may say, speaking of the land, that it slopes to the north, that when we talk about going up we are really going down, and when you are thinking about Prince Albert being away up above Regina you will understand it is 487 feet lower than that place; that when you are thinking about Moosejaw and Saskatoon that Moosejaw is over 1,767 feet above the sea, Saskatoon a little over 1,574 feet above the sea and Prince Albert 1,398 feet. You are going up all the time which is really down. And, gentlemen, that is one of the strong points that I wish to impress upon you to-day, and that is as you go north and the altitude keeps going lower that the boundary of the wheat-growing country that we have got goes farther north all the time. After I am dead and gone

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and many of you also, this northern country will be a glorious country filled with happy people growing enormous quantities of wheat and other products. That is just as true as that the sun is shining to-day; there is not the slightest doubt about it. It is our wrong impression that is causing all our trouble. I am getting out of my wrong impressions, and I want you, gentlemen, if you have any, to get out of yours also. Now take this point here (indicating on the map). After you get a little west of Lake Manitou you are just on the boundary between Alberta and Saskatchewan. At this point there was an engineer's camp, at which we stopped. From this point to Edmonton, there is no more bad land.

When I say bad, I mean there is no more land that is what I would call too dry to raise crops at present. Just there where my pointer is (indicating on the map) is Tramping lake, which was the only point where we found poor crops in the whole summer. The people told me that they were perfectly satisfied, that they had a fair amount of rain, but they said, 'We got in late and did not put in the oats until late in June; it stayed green, however, and would be fit to cut for fodder.' It was the only place in the whole country, as I said before, where the crops were poor, yet the people who were there, chiefly Americans, were quite satisfied, and said that although they came in late the land was good, and their prospects were good and everything was satisfactory.

By Mr. Jackson (Selkirk):

Q. You could not get a crop here if you sowed it in June?

A. No, and you would not attempt it now. We camped at this point, near Thomas lake, and met a Scotchman named Downey.

Q. I guess he was Irish?

A. He said he was Scotch, and he talked like one, too. He said he came out from Scotland a couple of years ago and went over to British Columbia and worked around Vancouver, taking out some of the big stumps there—some of the gentlemen from that side know what they are like—he cleared up a lot of ground quickly and got well paid for it and decided to settle upon the prairie. He came to Edmonton and was told by the agent there to work out in this direction. He reached the land upon which he settled on the 26th of April. We were there on the 19th August, and he had first-class oats, excellent potatoes, first-class barley, and had dug a fine well, he had put up a stable for a span of horses, and had a very good log house. He was a bachelor, i.e. had no wife, and, of course, I recommended him, as I do all bachelors, to marry, because I do not think it is a proper condition, especially in the Northwest, for a man to be without a wife. Mr. Downey said, 'I have done this this year,' and I wrote in my notes that in no other place than the Northwest could the like of that be done in one year. That is absolutely the case. He had an excellent crop of good dry potatoes and a good crop of hay, oats and barley.

By Mr. Staples:

Q. How much per acre was the yield?

A. I never asked after the yield of the crops.

Q. You would not like to recommend any person to go in and settle under those conditions, with the expectation of being able to produce a good crop in the first year?

A. There are settlers, and settlers. When I left Ireland for my own good, and perhaps for my country's good—I do not know about that—but when I left Ireland for my own good, I came out to Ontario and I worked for the magnificent sum of \$7 per month and my board.

By Mr. MacLaren (Perth):

Q. How long ago was that?

A. It is nearly sixty years ago, and we settled on land and paid \$6 per acre for the privilege of cutting trees off it.

THE EXPLOITER A BANE TO THE COUNTRY.

Now, I would not recommend, and never did recommend any person to go west to make a fortune. But the man who wants to make a home, who wants to get a farm and get out of penury and trouble, and away from day labour, I say to him: You are the man to go. We do not want exploiters in our Northwest; that has been the bane of the Northwest, the 'exploiter' who goes in for a great farm and a big crop of wheat, and then gets out. We do not want that kind of man at all; we want *bona fide* settlers, the men who will work, and the Scandinavian and the Doukhobors are just as good workers as you can get anywhere. That is what they do—they 'work'. But I will tell you what I have never seen them do: they never, not one of them, no matter how long they have been in the country, have one-half their land broken up. They have never been accustomed to the expansionist idea; they like to have a few fields well cultivated, and they are satisfied with them. But the exploiter that comes in and breaks up 100 acres or a whole section, a square mile, and if he succeeds, well and good, but if he does not, somebody loses money. I want to say that in all my travelling, I never saw anything to equal the section of country south of Beaver Hill lake.

By Mr. Ross (Yale-Cariboo):

Q. How far is that from Edmonton?

A. It is 45 miles from there to Elmonton, according to the way we went. There is a road, the only road I saw in the country west of Carberry. From the lake there is a road 45 miles long to Edmonton. But here is a picture, a lake 14 miles long and about 8 miles wide, in a basin, without banks, no matter where you are. It slopes back some 5 or 6 miles, and no matter where you are, as you look towards it, there is that lovely lake lying before you and some of the finest land in the world. There are plenty of settlers there, in fact the only village we saw from the time we left Yorkton except Saskatoon, was there, and we call it Tufield. The land slopes down towards the water, and it is all rich and good.

By Mr. Staples:

Q. How deep is the water?

A. I do not know the depth, but it contains an abundance of fish. At any rate that is where we camped. If I had seen that lake ten years ago, before the settlers came in—it has only been settled within ten years—I would have recommended some of my friends to go there, because it is the most beautiful place I know of in the whole country. It is a most lovely region, and everybody apparently is doing well, and there is a good region all around it. I met a man there named Phillips who bought the land at \$5 per acre two years ago from a man who had bought the year before that from the Canadian Pacific Railway for \$3.50 per acre. He told me that now it was worth \$25, and I do not think he would take that if it was offered him.

By Mr. Smith (Wentworth):

Q. What about that big country between the Grand Trunk Pacific and the Canadian Pacific Railway; there is a great block in there without any railway?

A. Yes, in here (indicating on map). You see this is the Saskatchewan river, this is the Red Deer river running up there, and this is the South Saskatchewan coming in here (indicating on map). I passed from there, that is the Elbow of the Saskatchewan, 150 odd miles over to here (indicating on map)—that is the Hand Hills there. I passed from here to Battleford, and there is no wood through there. Do you notice all these little ponds that are there? Well, some of those are fresh water and some of them are not.

Q. What is the land like?

A. The land is good, the soil is good. In some places it is perfectly level and at other times it is rolling hills. There is occasionally a belt of sandy hills which may be a mile or more across, or there may only be a ridge or two.

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ADDITIONAL RAILWAYS A REQUISITE.

But what is wanted in that country is railways, and what I was sorry to see when I was there, it is not generally known I believe, that from Saskatoon to here, Round Valley (indicating on map) the Canadian Pacific Railway is building a line running exactly parallel with the Grand Trunk Pacific.

By Mr Jackson (Selkirk):

Q. How far apart?

A. Sometimes 25 feet, at other times two or three miles, but it made me sorry to see it.

By Mr. Staples:

Q. Did it make you sorry to see the Grand Trunk Pacific building close to the Canadian Pacific Railway down there at Portage la Prairie?

A. If you will give me a fair show now I am going to come back at you. Now, this line runs out of Portage la Prairie; how would they get out west if they did not go there. The Canadian Pacific Railway is down here (indicating on map).

Q. How far apart are they there?

A. They are not far apart; but how could two lines be far apart there when they both start from the same place?

Q. They could have gone north of Portage la Prairie?

A. Now, of course, I do not know about that because I am not within the proper ring to do so. I am not on the ground floor.

By Mr. McIntyre (Strathcona):

Q. There was a statement made a few moments ago that the belt between the G.T.P. and the C.P.R. and the C. and E. was without railway communication. The point is that the railway starts from La Combe there, and runs 50 miles, and there is another one starting from Moosejaw and there is supposed to be an arc of a circle from there, from La Combe to Moosejaw, which in a year or two will be completed. There is also a line you speak of running to Wetaskiwin that runs parallel with the other line?

A. That is what I want to emphasize, that we want more railroads in that country. I am very glad you have given that explanation, because that is just exactly what that other gentleman had reference to. That is what we want, railroads, in this country. As soon as we get them, and what the people want, water and fuel, then the country will be all right. I was going to suggest that an attempt be made at the crossing of Battle river, by boring to see if there is not coal there. I am satisfied that there is coal there, and if it extends as far as that point, then there is plenty of fuel, and the people can go on these southern prairies and do well.

Q. I may say that I have a letter now from a man living at the crossing of the Battle river, the Canadian Pacific Railway take it, coming out from Wetaskiwin, the crossing of the Battle there—I have a letter from a man living there, asking permission to take the coal off his farm and supply the settlers in the neighbourhood, so there is no doubt about there being coal there.

A. I went up the Grattan creek, along which the Grand Trunk Pacific passes, and from the indications I saw, it struck me there was coal, and that was the reason I was going to suggest that borings be made. I did not know about the other. I believe it is the duty of the government to have borings made whenever indications are shown such as I have referred to.

There are one or two other points I was going to make, and that is, that there are certain points at which it is absolutely necessary to get artesian water, and there should be attempts made by sinking artesian wells in this country to find out whether the water is good and how much they can get, because the railroads cannot run through any country without water for their engines.

By Mr. Ross (Yale-Cariboo):

Q. Do you think irrigation is going to be a success in that country?

A. Not up there. They cannot get the water out of the Red Deer river, because it runs in a valley 500 feet deep. You know yourself, if you have been there, that it is hard to get in, but it is much harder to get out, if you have a cart.

WHEAT RAISING AS AFFECTED BY ALTITUDES.

By Mr. McCraney:

Q. Did I understand you to say, Professor, that the fact that the slope was north was the reason why the wheat belt would extend northwest?

A. No doubt about that.

Q. Will you explain about that?

A. A gentleman asked the reason why I say that as the land goes north, the wheat belt extends. Altitude has far more more to do with the growth of wheat in this country than most people are aware of. The Indian Head farm is pretty high up. It is 1,934 feet above the sea. Now, as you pass north from Indian Head and strike Saskatchewan or Saskatoon, you get into an altitude of 1,574 feet. You see at once that an increase in latitude is compensated for by the decrease in altitude. When you go to Prince Albert, you find it is only 1,398 feet above the sea. You are going up, you see, all the time (pointing towards map), but it is down. The changes that take place after settlement will make the climate of Prince Albert better than that of the countries farther south, which is up. Here is another point which is very important. The Canadian Northern is going to push on towards Fort Churchill, and it is not such a wild-goose scheme as most people think. Just listen, please. Cedar lake, at the point where they intend to cross the Saskatchewan, is only 828 feet above the sea.

By Mr. Derbushire:

Q. Could you show it, please, on the map?

A. (Indicating on the map). Here is Cedar lake and as I say it is only 828 feet above the sea. Prince Albert here is only 1,398.

By Mr. Ross (Yale-Cariboo):

Q. How far could you go before the compensating altitude of which you speak, would be wiped out?

A. It is not going to be wiped out. This point is within three miles of Hudson bay.

Q. Do you mean to say that wheat can be grown there?

A. Yes, sir. Over 40 years ago I went up to Lake Superior and coasted it in a sail boat and decided I was in the northern country. I went out of the boat and walked about 300 yards from the shore and I discovered that the flora changed in less than a quarter of a mile from the lake.

Q. You made the statement that you can grow wheat within three miles of Hudson bay?

A. Of course I do not want to be bound down. I would like to explain to you what I mean.

Q. I am not finding fault with you; it is a matter of opinion.

A. There is no reason why we should not. As you go down the Mackenzie you get into a latitude of $62\frac{1}{2}^{\circ}$ and you are 200 feet above the sea. Yet they have grown and are growing first-class wheat there.

By Mr. Lewis:

Q. How far north is that of Edmonton?

A. Between 400 and 500 miles north of Edmonton. They can grow wheat there without any difficulty.

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Q. That is pretty nearly north is it not?

A. Yes.

There is another point mentioned to me by a gentleman which is something extraordinary. At Fort Simpson, on the Mackenzie, potatoes form their balls as they did long ago and at the government experimental farm they have some of those balls growing—or at least they had potatoes growing from those balls and they are trying to raise new varieties. This year the government sent one or two of our men out to the northern country and one of them went here. This is Cedar lake. He went as far as Split lake and then he turned southwesterly. Now Split lake is 440 feet above the sea and he went southwesterly until he came into a country that he tells me is 100 miles in breadth and 200 long and consists of first-class soil.

By an Hon. Member:

Q. Is it level?

A. Level and well suited for agriculture. It was a revelation to me.

By Mr. Jackson (Selkirk):

Q. Is that on the road to Prince Albert?

A. No, on the Canadian Northern route to Fort Churchill.

Q. That would be just north of Lake Winnipeg then?

A. More to the east.

Q. To the east?

A. To the west, I mean. All this land in here is first-class land. I know it to be first-class.

By Mr. Martin (Queen's, P.E.I.):

Q. Have you any opinion about Great Slave lake?

A. Yes. When you get in from Great Slave lake, away from the water, the land is all right. This point is Green lake, and that is where I got potatoes. On the 30th September the tops were green. It is 300 miles north of here.

By Mr. Jackson (Selkirk):

Q. North of Battleford?

A. North of Battleford.

Q. They raise good potatoes?

A. First-class potatoes and what is more, they have a mill for grinding wheat there—a tread-mill for making flour. I found that out 31 years ago.

Q. Who is settled there?

A. It is the Roman Catholic Mission.

By Mr. Ross (Yale-Cariboo):

Q. That was not during a recent trip?

A. Oh, no. Just to show you the fallacious ideas that were formerly held, I may say that I went to the Minister of the Interior a long time ago, and he maintained that the Northern Saskatchewan country was no good. I said to him, 'Do you think that the heat stops there?'

By Mr. Bergeron:

Q. Do you mean to say they can grow potatoes there?

A. Why of course they can. And is there anything to interfere with their growing wheat? None whatever. It is not the summer frosts that is the trouble, but the local frosts caused by the peculiar conditions which we had in Ontario forty or fifty years ago. It is the local conditions that have got to be changed.

By Mr. Lewis:

Q. How far north of Battleford do the barren lands begin?

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A. The barren lands are largely due to the absence of soil. There is nothing but rocks and moss, but in the hollows have been discovered spruce trees over a foot in diameter. This year Mr. Stewart was down at the mouth of the Mackenzie in latitude 68° and found some very fine trees growing there, and within the Arctic circle they are actually raising potatoes.

By Mr. Jackson (Selkirk):

Q. Where will we find your report of 31 years ago?

A. It is in the Geological Survey report.

Q. I mean of your trip to the country 300 miles north of Battleford?

A. It is in the Geological Survey report.

Q. You were never there since?

A. I was never there since. But, gentlemen, let me say this to you as a last word. I am trying to create interest in that North land, and I am speaking on this subject because I am getting to be an old man, and when I am dead and many of you are dead, the people of Canada will begin to discover that that North land is to Canada precisely what Germany was to the Romans. It was hyperborean climate and supposedly unfit for mortal beings to live in, and yet to-day Germany is one of the strongest nations in the world. That is going to be the outcome of Canada. We have more than half a continent, and if we can raise first-class wheat and first-class women, certainly we ought to raise first-class men.

The Committee adjourned.

JOHN MACOUN,
Naturalist, and Assistant Director
Geological Department.

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HOUSE OF COMMONS, OTTAWA,

ROOM 34,

WEDNESDAY, January 23, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 o'clock a.m., Mr. McKenzie, chairman, presiding.

Prof. JOHN MACOUN was present by re-call of the committee, and submitted evidence as follows:—

Mr. Chairman and Gentlemen,—I wish to make a correction of one of my statements made on the last day I was before you; at least I did not make it clear enough. I said that wheat would grow to within three miles of Hudson bay. I meant to say that the conditions of the country are affected by the proximity of the bay to about three miles inland; after that the influence of the bay ceases to affect the general climatic conditions of the country. I cited Lake Superior as an instance, and I may say that we know perfectly well, those of us who live on the River St. Lawrence and on the borders of the Great Lakes, that the influence of the lake extends about three miles inland, that is, it affects the general conditions of the country only that distance.

By Mr. Wilson (Lennox and Addington):

Q. We will take the case of Hudson bay. After you have reached three miles inland what is the effect upon the country? Will they be able to grow wheat as well?

A. I am very glad you asked that. We know that wheat will grow, that it can be successfully grown as far north as latitude 56° in the direction of the bay. We know that now. That is seven degrees north of the international boundary.

Q. How near is that to the bay?

A. That is just exactly what I would like to know. I was looking to see if I had the note, but I will put the answer to that question in the evidence, when I get the report.

THE COUNTRY BOUNDED EAST BY HUDSON BAY

York Factory is in latitude 57° , and Fort Churchill in latitude $58^{\circ} 40'$. But I state this distinctly, that we know that wheat will grow up to latitude 56° , and that it has been grown successfully. Vegetables, too, of course, are known to grow far away north, and in fact, as far as York Factory and Fort Churchill, more or less. What I wanted to say now in this same connection is, that here (pointing to map) is Norway House at the head of Lake Winnipeg and Cedar lake, and down about here is Split lake. The head of Lake Winnipeg is just 710 feet above the sea, and at this point here, Norway House, it is just at the same level. That is, the north end of the lake is the same level above the sea as the south end of the lake, but when you come to Split lake, it is only 440 feet above the sea in latitude 54° . Mr. MacInnis, a member of the Geological Survey staff, was at Split lake this year, and he reports that there is a tract of country in here (indicating on map) about 200 miles in one direction and 100 miles in the other direction, that is well suited for agriculture. It is excellent soil, and, from his standpoint, he says he has no doubt whatever but it will be a first-class farming country in the future.

By Senator Perley:

Q. Is it timbered?

A. It is timbered. The poplar is very fine, and so is the spruce, in fact, the spruce runs up to 100 feet. It is most magnificent. Why I mention that now is this: We all know that Manitoba is low and level and has alluvial

soil, but the remarkable part of it is, that this was produced under precisely the same conditions. We know that this land was produced in the bottom of a great lake caused by an ice barrier. Our geologists know that lakes Winnipeg and Winnipegosis are remnants of this great lake, and that actually this land is covered by a stratum of first-class soil produced from the silt deposited in this great lake.

When I wrote that book (pointing to it), 'Manitoba and the Great Northwest,' twenty-six years ago, I wrote in it that the land on the Carrot river was the finest land in the whole Northwest, that its depth was wonderful; but when I wrote about Carrot river, I meant the land near its source, about latitude 52° . The Carrot river flows northeasterly and enters the Saskatchewan above the Pas. The land on the Carrot river is first-class all the way to its discharge into the Saskatchewan. In the lower part of its course the land is low and wet, owing to backing up of its waters by the Saskatchewan. All the lakes shown on the map, and others that are not shown on this map are caused by the backing of the water near the mouth of the Saskatchewan. The country around Cedar lake is almost completely covered with water, but the country is just as rich as the other land, the soil is the same, and before many of you are dead, they will do what I am going to speak of now, and you will see it for yourselves. The day must come when the government will set apart a sum of money for the purpose. This is Cedar lake here, and these are the rapids of the Saskatchewan (indicating on map). Now, Cedar lake is receiving the waters that come down the great Saskatchewan river, and the watercourse is being filled up. Behind Cedar lake is this large tract of country I am speaking about, and when the government decides to cut a channel in order to allow the waters of the Saskatchewan to flow freely out of Cedar lake, that country will be drained, and there will be an immense area of first-class soil added to the public domain that we now have, that is good wheat land.

By Mr. McCraney:

Q. How long a cutting would be required?

A. That is just a question I have been thinking about, and I would say that it is the duty of parliament to send, in the future—I will not say, in the near future—but to send an engineer there and have the lake properly examined. I have been asked why the floods are caused, and I say, by silt gathering at the head of the rapids, but I have not learned whether it is rock boulder, or a mud barrier that gathers there.

By Mr. Lewis:

Q. Have you any idea of the fall from Cedar lake to Lake Winnipeg?

A. It is quite considerable, about 118 feet.

By Mr. McCraney:

Q. About how many acres of land would be rendered available for agriculture, if this were done?

A. There would be really an immense area, but I have no knowledge of the exact number of square miles.

I mentioned that we know wheat will grow up to latitude 56° northwest of Lake Winnipeg. We know also, that during the past year wheat grew and ripened in an extraordinarily short period of time at Fort Simpson on the Mackenzie river in latitude 61° .

Mr. Stewart, Commissioner of Forestry, was down at Fort Simpson this year and saw wheat in the milk on the 15th of July last. It was reported to him by a man who passed up the river later on, that wheat was cut very early in August; if not before the end of July. As I say, this was in latitude 61° at about 850 miles north of the international boundary. You see this book which I have here; I wrote it 26 years ago and called it 'The Great Northwest.' I gathered all the information that I possibly could to back up my statements, and the remarkable thing is, that none of those statements have been proved to be incorrect. Instead of being too optimistic as it was said then that I was, we know that I did not know it all, although like many a young

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man at that time, I suppose I thought I did. What was written then has proved to be more than true to-day, and yet my statement at the time was considered the ravings of a maniac.

Now, gentlemen, I have tried to explain the facts about the West in a general sense, and I shall be pleased to answer any questions from you that I possibly can. If there is any question I cannot answer I will honestly say so and ask you to bear with me and I will get the necessary information later.

By Mr. Wright (Renfrew):

Q. I did not exactly understand the kind of deposit that you mentioned was accumulating in Cedar lake. What name did you use?

A. Detritus, I call it.

Q. Is that a sort of silt?

A. Yes, it is silt. It is stuff that is worked out of the river banks and is carried down by the current. You will understand that the big Saskatchewan, that is the North Saskatchewan, comes out of the mountains in a series of branches. So also with the South Saskatchewan and when they get down on the prairies, where the land is flattened out they go zig-zagging through the country gathering and picking up mud in all directions. These rivers are lovely when they come out of the mountains and the water is nice and clear, but when they reach the plains they accumulate a lot of white mud. This process goes on year after year. All these lakelets—which may be called the delta of the Saskatchewan—are being filled up on the line of the Lower Saskatchewan by the silt brought down by the river.

By Mr. Thompson:

Q. What is the latitude of Cedar lake?

A. The latitude of Cedar lake is $53^{\circ} 15'$. I said the altitude was 960 feet, but it is 828. That is Cedar lake there (pointing to the map) and this Lake Winnipeg. The latter is 710 feet, so there is a fall of 118 feet between the two lakes.

By Mr. Wright (Renfrew):

Q. Why is it called Cedar lake, is there any cedar actually growing there?

A. Yes.

Q. Is it of any size?

A. It was on the shores of that lake that amber, spoken of years ago, was found. Of course that amber is nothing but the gum from the old cedars that stood in the forest in former times. It is not really amber. That is where our cedar ends. I have never been there myself, but I am told there is a remnant of the cedar still there.

AGRICULTURAL PRODUCTIONS IN HIGH LATITUDES.

By Mr. Lewis:

Q. You say, professor, that wheat can be grown along the line drawn from latitude 56° to 61° and south of it. Does that apply to the centre of that land away from the lakes?

A. It applies in this way; wherever the land is fitted for wheat and the climatic conditions are suitable.

Q. The climatic conditions are what?

A. Wherever the climatic conditions are suitable to the growing of wheat. I do not mean to say wheat will grow in every part of that country at all, because there is a great deal of the land that is wet and swampy, but still there is enough of heat passing over the country to do it. Let me give you an example. This river which you see there (pointing to the map) is the Beaver river. It is running north as you will see, and farther down is Isle Lacrosse.

Q. Going north?

A. Yes, going north. Now Isle Lacrosse is 1,330 feet above the sea, and it is in latitude $55^{\circ} 45'$. Well, the reason I put that down in my notes: I was there on the 30th of September, 1875. The potatoes in the garden at that time were growing and had not been killed. The Roman Catholic missionaries had what I will call a horse grist mill to grind the wheat. The conclusion I drew was that they would not have a wheat mill if they did not raise wheat. That was in 1875, and as I say Isle Lacrosse is 1,330 feet above the sea. Athabaska lake is 690 feet above the sea, and if I were talking geologically to you, I would tell you that our Great Lakes lie nearly on the same level. Lake Superior, you know, is only 600 feet above the sea. Then we run in a north-westerly direction and we come on Lake Winnipeg, 710 feet. Then we pass on north-westerly again, and we come to Lake Athabaska which is 690 feet above the sea, thus showing that nearly all the Great Lakes run nearly on the same line.

COMPARATIVE PRODUCTIVENESS OF CEREALS.

When I was at Lake Athabaska in 1875 I learned from the missionaries that they grew wheat not to grind put to boil. I went into the field where the stooks were on the 23rd of August and brought away not the grains but the heads, and I brought them with me to Winnipeg, and the result is shown in this book. But here was the astonishing part of it, the wheat that I got at Lake Athabaska had an average of five grains across the face of the ear. When I took it to Winnipeg the American Consul there was astounded when he saw it. 'Why,' he says, 'we in Minnesota have very little more than two grains across the ear.' And you gentlemen haven't very often more than two in Ontario. And in Dakota they had not an average of three, but between two and three; but here I was, coming from the West, with an average of five. When I reduced it down to the average to the acre then I said the wheat of Manitoba and the West will have an average of three to four, and hence I put on twenty bushels to the acre on account of the number of grains. I said, 'If you can raise thirty bushels to the acre in Ontario under certain conditions, they will raise fifty bushels to the acre under the same conditions in the Northwest. Of course, I was talking big, gentlemen, but I had a big subject. At any rate, what I was at was this, that all things being equal the same number of straws in the far north would produce fifteen or twenty bushels to the acre more than you could obtain on the same number of straws in the east. In Winnipeg we had a kind of meeting of five or six of the leading men there; there is only one of those who were present living now, Professor Bryce, all the others are dead. Consul Taylor, of Winnipeg, was there, and he explained to us then—I knew it possibly then, but I know it better now—that whenever any kind of production comes near its northern limit it produces more, and its progeny seems to have greater strength. Now, since that time I have applied that principle to man and beast, and I find that it is correct.

By Mr. Lewis:

Q. It is the same way with the human being?

A. Yes. That is the reason I say that we northern people are going to be the dominant people. Of course it was all from Consul Taylor I got my information in the matter of wheat.

By Mr. Herron:

Q. What are the great obstacles to navigation in the North Saskatchewan?

A. Those mud bars; you call them sand bars, but I call them mud bars.

Q. Are they numerous?

A. Yes, they are numerous. You see the river current is running along and it meets a bar, and then possibly scoots across to the other side of the river and digs in on the bank on the other side, and then it bends out again. Wherever it goes in

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against the bank it digs in and washes the earth away, and wherever it leaves the bank it leaves a bar. At the lower end of these bars is always found a fine silt and at the upper end it is chiefly gravel, and as the river cleans out the bar at the upper end it keeps adding to it below. The river being so muddy you cannot tell where you are going to run on a bar; you are on the bar before you know it, even when you are going in a canoe.

By Mr. Lake:

Q. While you are on that subject, I think perhaps you may have referred to this matter before, but there has been some comment in the press lately, possibly it is an old story, of the possibility of the Saskatchewan breaking into the Qu'Appelle Valley. There has been some correspondence in the press recently on the matter, and there may be some alarm in reference to the question, and I thought you would not mind telling us your opinion on the matter from your observations.

A. Certainly. Two years prior to that book being written, that is 28 years ago, I was commissioned by, I might say Sir Charles Tupper, it was Sir Sandford Fleming who instructed me to go into this country and to go between latitude 51 degrees and 52 degrees after going to the 102 meridian, and start from there and go north-westerly. But particularly I was instructed by Colonel Dennis, who was deputy minister at that time, to go and examine and see whether they could not cut a canal between the head of the Qu'Appelle and the Saskatchewan, because it was then reported there was no difficulty about turning the waters of the Saskatchewan into the Qu'Appelle. I had two surveyors with me, and we camped at the elbow of the Saskatchewan there. There is a little river—well, the river is not wider than that (illustrating)—it is called the 'River that Turns.' This little river runs into the Saskatchewan just at the bend. Here (indicating on map) is the head of the Qu'Appelle river. Well, I sent one of my surveyors, Mr. Wilkins, to take levels across the head of the Qu'Appelle river to the Saskatchewan, and our hopes were dispersed. There was 85 feet difference in the levels; that is, the level of the Saskatchewan about the middle of July was 85 feet below the source of the Qu'Appelle.

Q. What was the distance between the two rivers?

A. Eleven and one-half miles, by their measurement.

Q. And at that distance the level of the Saskatchewan was 85 feet lower than the water in the Qu'Appelle valley?

A. Than the source of the Qu'Appelle.

By Mr. Wright (Renfrew):

Q. I understood you to say, at the last meeting, that you saw wheat growing on saline soil. Is that so?

A. Yes. When I used the term saline soil, I did not mean what is commonly called salt soil. I will put it in another way. I saw wheat growing on the land that we formerly thought would not grow anything, what they called bad soil, that was unfit for anything. I had that view myself, but I know better now. Saline soil is a better soil after it is broken up, because it contains more of the ingredients that make good straw and wheat.

By Mr. Burrows:

Q. Is that what we call gumbo?

A. Very likely it is what you call gumbo.

NAVIGATION ON THE SASKATCHEWAN RIVER.

By Mr. Herron:

Q. With reference to navigation, did the Hudson's Bay Company at any time send steamers up the Saskatchewan river to Edmonton?

A. Yes, I have seen them myself. I am glad you mentioned that question, because there are two or three things that will now come out of it. I myself took all my materials and provisions for five months and my whole stock of carts, and Mr. King, the astronomer, took his, from Winnipeg by boat to Fort Ellice by the Assiniboine, in the spring of 1879, and we beat, by a number of days, the whole crowd that went by land. We landed our stuff at Fort Ellice, and that same year, or perhaps the year afterwards, in 1880, people went by boat all the way to Fort Pelly, on the Assiniboine. But as the railways came in, there was no more steamboating of that kind. I remember, in the spring of 1880, when we came up in the same way to the site of the future town of Brandon, I asked a gentleman to locate some lands for himself and also for me. I suspected that Brandon was going to be located where it is now, and I wanted to be in the beginning on the ground floor, but he could not see it, and so I did not get any.

Q. What length is the Saskatchewan river without any rapids?

A. I do not know of a rapid on the Saskatchewan from above Cedar lake. There is no rapid, as far as I know, to far above Edmonton, and perhaps above the Rocky Mountain House.

Q. Then, there would be a distance by the river of 1,700 or 1,800 miles?

A. Very likely; I would not be able to say. But, you see, the railroads are stopping all that. I saw the steamboats come down loaded to Prince Albert from Edmonton, in 1896, when I was there. Now, you see, that is all done away with. But this is the point I would like to speak about—

By Mr. Lewis:

Q. Where did they go from Edmonton, you say you saw them coming down?

A. They did not run above Edmonton.

Q. How far down did they go?

A. They went down as far as the head of the rapids. The Hudson Bay Company had a sort of little tramway at the rapids. They used to send their stuff up to the rapids, and the boat would take it to Edmonton.

Q. From Edmonton to Cedar lake?

A. That is the way the boat used to run.

By Mr. Thompson:

Q. The whole distance by the river?

A. They would go by the river all the way.

Q. From Cedar lake to Edmonton?

A. From Cedar lake to Edmonton.

Q. How many miles would that be?

A. It is fully a thousand miles by the bends and turns.

Q. What would be the size of the boats that would ply on that river, I mean steamboats?

A. These boats are stern-wheelers.

By Mr. Burrows:

Q. Some of them are 300 tons?

A. Yes. The fact of it is, gentlemen, that the building of railways is obscuring our vision, you may depend upon that, in connection with these matters. That is the reason I wanted to say to you, if you would excuse me, that there are no roads now in the Northwest. There used to be roads, but there are now none. There is not a leading highway at all. The only one that is partly kept up is on the old line towards Humboldt, running to the Saskatchewan. Every town has a few roads leading out from it, but when you go out on one of them and follow it up, you go plump against a fence. The old trails, which you could follow with advantage, are wiped out. Thirty or forty times, last year, when out in that country, we would follow up a road and come to a man's fence. We did not ask any question, because we saw no person there

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to ask, but we just pulled the posts down with the wire attached, and laid them down, and rode into the field. Then we crossed to the other side and did the same thing.

By Mr. Wright (Renfrew):

Q. And went on your way rejoicing?

A. Yes.

By Mr. Burrows:

Q. What locality were you in last year?

A. I travelled from Portage la Prairie to Edmonton, along the Grand Trunk Pacific. I thought we were going to have it as easy as I had twenty-seven years previously, told my men that when we reached the 'old trail' all would be well; but the trail sometimes did not run a mile, and we were in sloughs and bogs, as usual.

By Mr. Crawford:

Q. You find roads in Manitoba sometimes do you not?

A. They fix the roads to suit themselves; they do not suit me. Each man has a road to suit himself and when I got into the Galician settlements in Manitoba, what was the result? You would ask 'Is this road all right?' 'Oh, yes' was the reply and we would follow it and find ourselves at another man's place and have to go away around in order to get out again. Everybody is a road-maker to suit himself there.

GROWING WHEAT ON ALKALINE SOILS.

By Mr. Schell (Oxford):

Q. Is the alkali an injury to the production of wheat or is it considered a benefit?

A. Yes, absolutely, and that is where the grand value of our Fife comes in.

Q. When I was out there I heard a great many reports as to alkaline land being worthless for the production of wheat. I think I heard you remark that you found the very best wheat growing on land considered very bad for alkali. That was my impression also, as I went through the country. I thought I saw land with strong indications of alkali and yet it was considered the very best land for wheat.

A. That is where I gave advice for these people. I would say 'have you broken the land up and found the wheat would not grow?' 'Oh, no,' they would say. Then I would tell them, 'It is no use in your condemning the land unless you have got the actual proof of the thing.' I will give you an example to illustrate what I mean. In 1872 I went out with Sir Sandford Fleming and when we reached Winnipeg, I stopped with Governor Archibald in the old fort. While there I met the future chamberlain of the city, an active little man called Brown. Some of you may remember him. He was the city chamberlain in Winnipeg afterwards. Brown was a progressive man and upon hearing that I was there he came and showed me a well he was digging. It was the first well that was dug there, and I remember the big square hole down through the black stuff which was lined with beautiful white crystals. We called them alkali crystals as a general term. He said to me, 'The water in that well is of no use, it is salt. How far must I go down before I come to good water?' Even in that day the folks thought I knew a whole lot of things that I did not, and Brown was one of them. Well, I said, 'I do not know, but I will tell you this much; that you will have to sink until you come to gravel. If you should get through to China you will obtain no good water until you strike gravel.' We left the well and went out to a potato patch. Now I am coming to the alkali. Going to the potato patch, between the city and Fort Douglas, there was about a mile of land without any occupants. We came to a slight depression in the road and what did I find in it? I was a botanist, you see. I found a whole lot of seaside plants that exist along the Lower St. Lawrence and along the coast. I was astounded at the fact, I had no idea that they were growing on the roadside there, but I took the plants and brought them along to the potato patch. He had broken up a little basin, quite a shallow basin. You know that around Winnipeg at that early date the earth was so trodden with carts and the camping of people

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that there was no grass growing on it, at least none of any length, and when the rain would come it would all run into little hollows. The ground was covered with these little hollows six inches or a foot in depth.

HOW ALKALINE SOILS IMPROVE BY TILLAGE.

But he had gone into one of these places and had broken it up and planted his potatoes, and the potatoes were all in spots. Here and there there would be a few hills and on the other portions there would be nothing. I said, 'What is the matter?' He said, 'That is just the matter, what is the matter? That is what I brought you here for, to find out?' I said I did not know what was the matter, and neither did I until I looked into it, but I will show you. When I began to look into it and to examine the plot I found that potatoes were growing on elevated spots in the plot, and that in the hollows there were none, and then when we dug them up we found the potatoes were all rotten; the alkaline plants, some of them were still left there, you know the kind of ploughing they used to do in the West—cut and cover—and they were growing there. There was the solution of the whole question, there was too much salt. You do not hear anything of that now. Why here is the law. As soon as ever alkaline soil in the Northwest is broken up and the rain is allowed to descend upon the broken up soil it takes the surplus of alkali and puts it down. In other words, it leaches the superabundant alkali out of the soil and leaves it in good condition for growing grain.

Q. Yes, but how long does it require? It takes several years to do that?

A. It just depends upon the amount of alkali that is in the soil, it may take ten years sometimes, though I doubt it.

By Mr. Schaffner:

Q. It takes a great many years to get it out. Where there is a great deal of it in the soil in the dry season the soil becomes quite white?

A. It has been established by actual experience that as soon as they begin to break up the soil and let the rain penetrate it the superabundant alkali in the soil is washed out.

By Mr. Smith (Oxford):

Q. Was not that discovery made by the experimental station at California, and the results demonstrated on the alkaline lands of Arizona?

A. It may have been; I would not doubt it, because I do not know. But that it is absolutely true I am sure.

By Mr. Lake:

Q. You would not advise any man to start operations by breaking up alkali land because it takes several years before you can get the alkali out of it. I have had experience of that myself?

A. Certainly not.

Q. It takes four or five years at least, and it is only after you have kept plugging away long enough that you are able to obtain results?

A. I confess I would not go on alkali land myself.

Q. You would not recommend any man to go there on alkali land where he would have to wait until the superabundant alkali was exhausted?

A. No, I would not. But it is not so much the question about growing grain on alkali land that is a serious matter as is the difficulty of getting good water, which is an absolute necessity.

By Mr. Schaffner:

Q. Did I understand you to say that you have to go to gravel before you can get good water?

Q. Beg pardon, I am speaking of Manitoba. But when you get on the second prairie steppe—

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Q. Well, take Manitoba then?

A. I am speaking of this land in the old lake bottom. But when you get to the prairie steppe, to the second prairie steppe, we get to what we would call rock in situ—in other words, the land is covered in places with drift and in other places there is no drift. Where there is no drift we have alkali lands that you are speaking of. The alkali land at Winnipeg is not of the same character as the alkali land on the second prairie steppe. I am very glad you brought this up, because it is a very important matter. There is a basin that contains fresh water, and here is another basin and when we examine it we find it contains saline water. Now, the question comes up, 'Why?' This one with fresh water is on the drift, and this one with alkaline water has its bottom on the impervious St. Pierre shales, as we call them, that underlies the greater part of the prairie as a permanent sub-stratum. To me this is a most important question, this water question. When I am speaking of alkali at Winnipeg it was of water on the surface; but when we speak of the bad lands on the prairie with these St. Pierre shales on which it is based, the alkaline stratum, the deeper you go into it the worse is the water you get; hence, to get water all over the second prairie steppe you must keep in the drift which overlies that. This applies also to the third prairie steppe, when you get beyond the Beaver Hills and down to Battleford. I am speaking of the prairie country; when you get into the valleys the conditions are different.

By Mr. Schaffner:

Q. We have a great deal of trouble in regard to water. Of course we are on the second prairie steppe, 180 miles west of Winnipeg. With us, if a man started to dig a well the surface alkali would not make much difference, but when we get wells 200 feet deep the deeper we go the worse is the water; it makes no difference.

A. No, you cannot get good water. That is a law to me. If a gentleman says to me, 'How will we get good water on the third prairie steppe?' I would say, 'In shallow wells.' Another man said to me, 'My well is thirty feet deep,' and I said, 'I am glad you did not go through the drift, because if you had done so you would not have got good water.' When you get west of Edmonton you can go deeper, because the drift is deeper there. But it is a serious matter with regard to wells, and therefore I would recommend, in fact I have done it repeatedly, that every farmer that has not good water should gather his rainwater and put it in tanks.

Q. Might I ask you what you mean by the term 'drift'?

A. It is a superficial soil that was not laid down at the earlier time. It is gravel and stones, and clay, sand mud that overlies the alkali that you are speaking of. All of the alkaline ponds in the Northwest are based upon impervious conditions, clay, or something in the bottom that prevents it from leaching away. The fresh water ponds are very often produced from springs.

By Mr. Thompson:

Q. If this water were filtered would it not be good?

A. No, it is not a mechanical mixture, but a real chemical mixture. We found nearly all the ponds in the Touchwood country contained a slight solution of Epsom salts, some of them more so than others.

Q. Are you speaking from experience, Professor?

A. I am, sir.

By Mr. Lewis:

Q. On the second and third steppes, would ploughing make that eventually good soil, the same as in Manitoba?

A. Yes, I am satisfied that all these alkaline lands will be first class, when they are broken up and cultivated.

By Mr. Derbyshire:

Q. And the salt taken out?

A. And the salt taken out.

PROFESSOR MACOUN'S LONG AND VALUABLE PUBLIC SERVICE.

Mr. DERBYSHIRE.—I beg to move, seconded by Mr. Wright (Renfrew): That the thanks of this committee be now tendered Mr. John Macoun, Naturalist to the Geological Survey Department of Canada, for the valuable information laid by him before the committee on the natural capabilities of that large section of Western Canada extending from Edmonton to Portage la Prairie, on the occasion of his appearance before us on this subject. The committee desires also to report its appreciation of the valuable services Professor Macoun has rendered to Canada in the past thirty years of his arduous and official services as a practical science officer of the Geological Survey of the Dominion, notably the following explorations of territory:—

Professor Macoun's first trip across the prairies was with Sir Sandford Fleming in 1872. His glowing report of the country traversed caused him to be sent again, in 1875, to explore the route that it was then intended the Canadian Pacific Railway would follow. When the present route was decided upon, the government sent him, in 1879, 1880, and 1881, to report upon the country that would be opened up by the railway. Optimistic as his reports and prophesies were, they have all proved true. To these are to be added Professor Macoun's explorations in the Canadian Yukon Territory, in 1903, which revealed for the first time that that far northern division of Canada also possesses agricultural resources of no mean order.

The motion was put and carried.

The CHAIRMAN.—I have much pleasure in presenting you, Mr. Macoun, with this motion of thanks from this committee for your valuable services, both past and present.

• Professor MACOUN.—Gentlemen, I thank you very much for your kindness in passing this resolution. To an old man it seems like great appreciation.

Mr. LEWIS.—If Professor Macoun is not tired, I would like to have a word from him on the Peace River country.

Professor MACOUN.—I will answer any question that the members of the committee desire to put to me. I might say, that is the country from which I got the wheat, in 1875, that took the prize at the Centennial Exhibition, in Philadelphia.

By Mr. Thompson:

Q. What is the latitude?

A. That is in latitude 59°.

By Mr. Lewis:

Q. How far north of Edmonton?

A. Edmonton is in latitude 53° 53'. It would be at least 400 miles, in a straight line.

By Mr. Thompson:

Q. Where is Dunvegan?

A. Dunvegan is there (pointing to the map); that is Peace River Landing, and Vermilion is there. There is where the river divides, part going into Lake Athabaska and part into the Slave river. It was there that I got the wheat, in latitude 59° exactly. That point is 690 feet above the sea. Vermilion is 950 feet above the sea and in latitude 58° 24'. This is Peace River Landing here. It is in latitude 56° 15'. Down by the water it is 1,225 feet above the sea. The banks are 700 feet high.

Q. How early in the spring can seeding be done in the vicinity of Peace River Landing and Dunvegan?

A. Of course, I could not answer that personally, but I can say, in general terms, that it is not much later than on the prairie. Why do I say that? A hundred years

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ago, on the 15th April, 1792, where Sir Alexander Mackenzie wintered, at the mouth of the Smoky river, he got the prairie anemone, which the farmer calls the crocus, in full flower. At St. John's, the same anemone was in flower on 22nd April, 1873. I was there in 1872. That was in the river valley sloping towards the south. Dunvegan itself is in latitude $56^{\circ} 56'$. It is 1,395 feet, at the water, above the sea. Mr. Horetzski measured the banks of the river from the water up to the level prairie, and made it 687 feet. The general level of the country above Dunvegan would be from 2,000 to 2,300 feet.

Q. Is there much of a snowfall there?

A. In some years; in another year it is light.

Q. Do they have the chinook?

A. The chinook winds are not noticed there, as far as I know; but now that you mention it, I may say that they are noticed here, on the line of the Grand Trunk Pacific Railway. Up through the Yellow Head pass and on the west side of the mountains the chinook is found.

I will not enter at any detail into explanations of the cause, because the time is short. I have made this general statement, gentlemen, and I will now answer any questions that you may submit.

Q. Is not the quality of the wheat improved a great deal in that northern district on account of the long days and the greater amount of sunshine?

A. I have not the slightest doubt, that the length of the day and the greater amount of sunlight has all to do with it. I am satisfied that it is the long day and the clear sunlight that has to do with our wonderful wheat in the Northwest. I have studied the whole matter, and we who know the Northwest know perfectly that a rain-storm will come on, and it is gone and as soon as it has gone, in no time, the sun is out again; and the long days, eighteen hours and sometimes away farther north there is no darkness whatever—there is not the slightest doubt that all these things combined are the reasons we have such wonderful wheat in the west.

By Mr. Thompson:

Q. Do you think the amount of sunshine you get in the early summer will make up for the difference in the latitude between Winnipeg and Dunvegan in the growth of wheat?

A. Yes. The growth in the north, as I discovered up at Dawson, the growth never ceases. When you come down to the Mackenzie basin, which is in latitude 61° , Mr. Stewart, of the Forestry Department, went down the Mackenzie this year, as far down as latitude 61° , and found any amount of vegetables growing in the most wonderful luxuriance, and it all came from the long day and bright sunshine.

Q. This anemone you speak of grows in Dawson in great profusion, we get it in April. But the point we are getting at is will wheat ripen in the Peace river valley on account of the early fall and northern altitude?

A. I am glad you brought that out. Altitude is the bane of ripening. It is not latitude that is the bane, it is altitude. The plateau of the Peace River country runs up to 2,500 feet and more. If you put a thousand feet upon the top of King's mountain here, it would not be as high as that is, and this is only latitude 44. You would not think of growing wheat away up in the air that way even at this latitude. When you get down to Peace river, at Dunvegan, the wheat that is growing there is growing down in the valley, in a trench with the big banks towering up 700 feet above, and when you come down from here at this point (indicating on map) the banks keep falling away, and when you get around here, at Vermilion, it is only 960 feet above the sea. Whereas the river bottom at Dunvegan is 1,305 feet above the level of the sea. So that you see, at once, the difference, the change of the conditions. After you come down to Vermilion the whole country is suited for wheat growing and there is no difficulty about it whatever.

Q. Even although it is so much farther north?

A. It does not matter, it is altitude, not latitude, that counts.

Q. What is the extent of the country up there that you speak of?

A. It extends—this is a guess, you know, gentlemen, I am not sure,—but to my mind there is no reason why that country should not extend away up to the Liard.

Q. Have you been up to—

A. No, but there is no reason why it should not extend across to the Liard, there, taking that whole country that runs up the Slave river to old Fort Simpson, and across from Vermilion to the Liard.

Q. About how many miles is that?

A. I cannot say, it may be a couple of hundred or much more.

By Mr. Lewis:

Q. Has not that county been travelled over?

A. People have been along the rivers, but the men who have been there have not been there for the purpose of making observations.

By Mr. Thompson:

Q. What is the limit of altitude at which wheat can be grown in any part of Canada?

A. That is a question that time is going to settle. I would not doubt that in time to come, when the country is cleared up and settled, that this altitude I speak of in the Peace river as being too high will produce good wheat.

Q. The hills at Dunvegan are 700 feet higher than the valley, is it possible that good wheat can be grown there?

A. I have not the slightest doubt but that some years it will be successfully grown and other years it will not. It will be uncertain, but the day will come when it will not be uncertain. Depend upon it that the wheat itself is to-day becoming acclimated, that is the wheat you are growing in the Northwest is changing in its conditions and it is ripening itself earlier than it formerly did. Sooner or later, from whatever cause, that will be the result, conditions are changing and I found it so this year. When I started out from Portage la Prairie, I commenced to talk to the farmers to get them to tell me when they sowed their grain, so that when I reached Edmonton I could find the difference between the times at which it ripened. It was just as good and as early a little out of Edmonton as it was in Manitoba, if not better. In the Peace River country we have an immense tract down there in that low region that will produce anything and that is going to support a big population in the future.

By Mr. Chisholm (Huron):

Q. There is a difference in the altitude even between Edmonton and Vermilion?

A. There is 1,228 feet difference.

Q. Yes, that will account for the difference in the prospects of raising wheat?

A. Yes, I think the prospects are more certain because there is no freezing down there; that is a point I forgot to mention. There is no possibility of freezing in the north at night, owing to the long day.

Q. But you may have frost there on the high mountains?

A. You will have frost here away up at a high altitude, but when you get down to the low level it does not cool off enough at night to freeze.

Q. It is the frost that is the danger?

A. That is what we call the white frost. This is always local.

By Mr. Schell (Oxford):

Q. How far north of Edmonton is the point at which you got samples of wheat for the Centennial?

A. Edmonton is in latitude 53° 53'. It will be 5 degrees north of Edmonton. I obtained the sample of wheat at latitude 59°. That will be 360 miles due north from Edmonton, where I got wheat with five grains in the fascicle across the ear. I put the ears in bottles and sent them down to the Exposition at Philadelphia in 1876. They had never seen such wheat before.

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Q. How many bushels to the acre do you think that would bring?

A. If a certain number of straws from Ontario would produce thirty bushels to the acre, that northern wheat with the same number of straws would produce fifty bushels.

By Senator Jaffray:

Q. If that district were settled and cultivated, can you give us any estimate of the quantity of wheat that could be produced there?

A. No, I would not attempt to do that. But I would say this, that the day is coming in which that north country that we consider of no value will be as great a country as Germany is to-day. That is the country that we do not know anything about at present.

By Mr. Thompson:

Q. Is there very much of that Peace River Valley that is alkaline?

A. The banks of the Peace River are of the same kind of shale that this gentleman was speaking about. You will remember if you have been there that the alkali comes out at the side, but I could not tell anything about it, I was not through the country enough to know; but in the river valley, yes, there is a number of alkaline springs.

Q. To what exhibition did you send the samples?

A. The Centennial, in 1876, and obtained the bronze medal for both wheat and barley gathered at Lake Athabaska in latitude 59° on August 23, 1875.

Q. At Philadelphia?

A. Yes, thirty years ago last year.

Prof. Macoun then retired.

The committee then adjourned.

JOHN MACOUN,
*Naturalist, and Assistant Director,
Geological Department.*

THE MACKENZIE RIVER BASIN.

HOUSE OF COMMONS,

Room 34,

January 30, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 10.30 o'clock a.m., the chairman, Mr. McKenzie, presiding.

The CHAIRMAN.—Gentlemen, we have with us this morning Mr. Elihu Stewart, Dominion Superintendent of Forestry, and I have much pleasure in introducing him to the committee.

Mr. STEWART.—Mr. Chairman and Gentlemen,—I have had several opportunities of appearing before this committee before and for that reason it will perhaps not be necessary for me to go over all the ground that I otherwise would. I shall endeavour to be as brief as possible and to give as much information as I can regarding the work under the Forestry branch of the Department and after that, a résumé of a trip I took last season down the Mackenzie river.

PROTECTION OF FORESTS AGAINST FIRE.

As you are aware, a few years ago the department undertook the work of guarding timber on Dominion lands. The system worked out then was, that the government should appoint fire rangers and the cost of the work would be divided between the Government and the holders of timber licenses, the Government paying the whole cost of that upon unlicensed territory. The reason of this will be apparent. It would be unfair, of course, and even absurd, to charge the limit holders for any territory which they had no claim on, and on the other hand the Government having an interest even in the licensed timber, it was considered that the system that had been followed in the Provinces of Quebec and Ontario would be a fair one: that is the limit holders should pay one half the cost of guarding this timber. During the past season we have had 74 regular rangers employed and the total cost of the service was \$28,809. Of this number 26 were in British Columbia and 48 east of the Rockies. In addition to this a number of extra men were employed for short periods to quell bad fires. I might say that these rangers, who are regularly employed, have authority, in case of a disastrous fire occurring, to call out additional assistance for a short time, the accounts being vouched for by the fire rangers before they are presented for payment. In addition to this work, during the past season ten men were employed in making a careful examination of the Riding Mountain reserve at a cost of \$2,532. The object of this work on the reserves that have been set aside by Act of Parliament was in order that we might know what we actually had on these areas. Examinations were conducted in the Moose Mountain reserve and in the Turtle Mountain reserve last year. The data collected has enabled us to locate and map the timber, to ascertain the extent of fires on the reserves, and the roads or trails needed for the protection and administration of the reserves, also an estimate of the amount of fuel and saw material available for use.

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FOREST RESERVATIONS.

The result of the past year's work has not been collected yet, or at least not tabulated, but just to give an idea of the formation that we have regarding the Turtle Mountain reserve, I might say that from the measurements that were made—(every tree was not measured but strips were measured and an average taken)—it was found that we have over 77,000 cords of green fuel in those mountains, over 91,000 cords of dry wood, and over 1,000,000 feet of saw material—that is, timber fit for lumber. In the Moose Mountains we have 93,000 cords of green fuel, 100,000 cords of dry fuel, and something like 5,000,000 feet of saw material. I am speaking of the forest reserves. You perhaps will remember that at the last session of Parliament an Act was passed by which 21 forest reserves were created, part being in the railway belt of British Columbia and part in the two new provinces, and also in certain districts in Manitoba.

The whole area of these reserves is 5,391½ square miles. The Act in question places the management of them under the Forestry branch, and also provides that these shall be more than simple timber reserves: they are to be reserved for fish, game and all the animals in them. We are endeavouring to work out a system of service there which I think will be of very great value. In our northern territory we have a country which, in addition to the very important asset of timber, contains valuable fur-bearing animals, and I can see no reason why these timber reserves should not also be game preserves, not only for the animals for the chase but also for the sake of the fur they will produce.

TREE PLANTING.

I shall go on to speak of the tree planting. You are aware that since the year 1900 we have been engaged, in co-operation with the prairie settlers of the Northwest, in growing forest trees. This has grown to be a very important part of the work of the Forestry branch. I have tabulated the distribution of trees from the time that we started the work. In 1901 we supplied 18 farmers with 58,000 trees. In 1902 we supplied 415 applicants with 468,000 trees. In 1903 we supplied 627 applicants with 920,000 trees. In 1904, 127,000 applicants with 1,800,000 trees. In 1905, 1,122 applicants with 2,000,000 trees in round numbers. In 1906 there were 1,200 applicants who received 2,100,000 trees.

By Dr. Barr:

Q. Might I ask you, do you give those trees free to the farmers?

A. Yes.

Q. How do they send in their application?

A. If you will just pardon me one minute, I will explain this first. In 1907, this season, we have ready to distribute two million trees to 1,421 applicants. When we have distributed those that are now 'heeled in' ready to distribute, tied up ready for distribution this coming spring, we will have distributed a total of 9,346,000 trees, and the average number supplied to each applicant is 1,400.

Now, in answer to the question as to the system on which we proceed in this work, I would say that any applicant wishing to act in co-operation with the government in the growing of trees makes application to the office here. He may apply on a slip of paper or a postal card, or in any way at all and let us know that he wants to co-operate with us. We then send to the applicant a form which he fills out, giving the number of his lot, his post office address, express office and other information which we need. We do this because so frequently in writing the applicants do not give us this information. Upon that printed form they make their formal application which is filed. For next season the applications are coming in now, and next season every one of these applicants will be visited by an inspector who will inspect the ground and take notes of the kind of soil intended to be used. When we receive the inspector's report we will be able to determine what kind of trees will best suit that particular district. A little plan is made of the ground where they are to plant

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the trees, and they enter into an agreement with the department that they will, if furnished the trees free, set aside a certain portion of their land for the purpose, that they will not destroy the trees, that they will keep them fenced and will preserve them from fire; also that they will keep them cultivated for about five years, or until such time as they do not require further cultivation.

Q. What kind of trees have you for distribution?

A. The principal varieties are the Manitoba maple, the green ash, the cotton-woods, and in certain cases the Russian poplar and some elms. The main object is to assist the settler in growing shelter belts on his homestead. We do not aim at furnishing all the trees that we hope will be grown in the Northwest eventually, but we are doing an educative work and, at the same time, giving a shelter belt or fringe to the more delicate shrubbery and coniferous trees, and it is expected that the settler will follow up the work in this direction.

By Mr. McCraney:

Q. From what part of the west are these applications coming in?

A. The applications are general from all parts of the prairie between the Rocky Mountains and the Red river. But I want to say this that we do not supply trees to anyone who is living where they have trees growing naturally. That is not the object. Our desire is to encourage the growing of trees where they are not grown now.

By Mr. Lewis:

Q. Have you any trees for distribution in Ontario and Quebec?

A. No. In fact the distribution is only made on prairie lands.

By Mr. Blain:

Q. Have you any statistics to show what proportion of these trees live?

A. That is a very important question and I am glad it has been asked. I had our inspectors, when they were going around, make an estimate, and although I have not yet had the estimate for this past year tabulated, but for the year before, going over the inspector's reports and taking the list of all that we had furnished during the years that the distribution had been in progress, and taking the number then living as estimated by the inspectors, the record shows that about 85 per cent were then living, that is 85 per cent of all that had been sent out were living in the summer of 1905.

By Mr. Burrows:

Q. How old are these trees when sent out?

A. The seed of the Manitoba maple is planted in the spring, taken up and heeled in the fall and sent out the next spring. The ashes take two years, and the elms, of course, take much longer.

At the present time I might say that the applications are coming in at a much greater rate than in previous seasons, we have an average of about fifteen applications received at our office each day, and they will increase much faster from this on until the first of March, when we cannot receive any more for this year.

By Mr. McCraney:

Q. Where do you get your supply of trees from?

A. I have placed on the wall here a photograph of trees growing in our nursery. We grow them at the Forest Nursery Station which we have established at Indian Head. At first when the work started the Agricultural Department was kind enough to allow us to use a portion of their land at the experimental farms at Brandon and Indian Head. The work, however, got so large, and we required so much land, that it was impossible for them to give it to us, so we took 160 acres just south of Indian Head, about 1½ miles from the station and we have concentrated the whole work

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there. The trees are nearly all grown from seed, with the exception of the cottonwoods. The cottonwoods are difficult to grow from seeds, but cuttings can be got from along the river banks. We have got most of them from the river of Dakota near Bismark, the Missouri river; they grow along the bars there. We could not get them any other place as well or as cheaply as we do from that point. Nearly all we have are brought from there.

By Mr. Wright (Renfrew):

Q. Do you own that 160 acres?

A. Yes, we have taken that over, it was Indian lands. We are now acquiring 320 acres; there was 160 acres taken at first, but we have now enlarged it to 320 acres. I have some photographs of the buildings that we have erected there which will be passed around for the inspection of the members. We are not only growing trees for distribution there, but there will also be a permanent nursery, we are trying to find out what imported trees will grow in that climate under forestry conditions.

Q. Did you ever try walnut?

Q. No, but they have been tried at the experimental farm; we do not attempt to do anything that has already proved a failure when it has been well tried at the experimental farms. It is beyond the range of walnut or hickory. There was a question asked here once before about hickory, but it is useless, I think, to try it in that climate.

The objects aimed at in starting this system of co-operation were first, to assist the settlers on the bare prairies in growing a forest plantation on his homestead, and second, by so doing to educate not only the individual so assisted, but his neighbours in the work of silviculture. Here is an object lesson all over the plains of the Northwest. It may be perhaps only one or two in one township, but if the settlers there see how those trees have grown, how they have been cultivated and under what conditions they have grown, they can go on and do the work for themselves. Many of them we hope will do so. More than that they will be able to grow fuel as well. If I had time I would be able to give figures to show that it will be profitable for them to grow a certain quantity of timber for fuel.

By Mr. Shaffner:

Q. In regard to Manitoba maples, have you any definite idea how long they will live?

A. How long they will live?

Q. There has always been an idea in the country that the Manitoba maples are not long-lived?

A. I think we had one on exhibition which was eighty years old.

Q. There is quite an impression in the west that the lives are from fifteen to twenty years?

A. I do not think they are long-lived trees by any means, but it is a capital tree for shelter purposes even if we only get it for a few years. Within that shelter other trees can be grown thus serving the desired purpose. The green ash is a much favoured tree in the west.

Q. So is the elm?

A. And the elm too, but the ash is easier grown there.

By Mr. Lewis:

Q. What is the difference between the Ontario maple and the Manitoba maple?

A. The Manitoba maple does not grow to the size that our maples do. It is not as hard as the hard maple. There are many points of difference between them.

By Mr. Wilson (Lennox):

Q. Is the Manitoba maple as hard as our soft maple?

A. I think it is quite as hard as our soft maple.

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By Mr. Burrows:

Q. I saw a few of those trees growing opposite the Surveyor General's office that were 10 to 12 inches in diameter?

A. Oh, yes.

By Mr. Jackson (Selkirk):

Q. Where do they call it box elder?

A. They call it box elder in Dakota. Our own maples are far better and we should never bring Manitoba maples here. But they are very hardy and they answer the purpose on the plains in a way that no other tree does.

TREE NURSERY STATION.

By Mr. Wright (Renfrew):

Q. The fast-growing are poor trees as far as wood is concerned.

A. I might say a few words with regard to the nursery station at Indian Head, for I have not mentioned it before. The buildings were erected in 1904 when the land was bare prairie. One hundred and sixty acres have now been brought under cultivation or else is occupied by roads, buildings, dam and pasture. In 1906 24 acres were under actual nursery crops, 14 were summer fallowed. It is necessary that this ground should be worked up before we can plant the trees upon it: 25 acres were under oats; on 25 acres there was fresh breaking and backsetting, 15 acres under pasture, 14 acres under permanent plantation, and 14 acres were under hay and barley. According to carefully prepared figures based on the actual wages paid out and the time devoted to each department of work we found in 1905 57 cents represented the actual cost per thousand of raising the seedlings for distribution. Including the total wages paid out at the nursery in 1905 the average cost per thousand is brought up to \$1.42. Over 50 per cent of these wages represent preparing ground for future crops, fencing, laying out, caring for ornamental grounds, roads and drives, and caring for permanent plantations which cannot be properly charged against cost of seedlings. So that \$1.42 was the whole cost per thousand of trees. In 1907 there will be 37 acres under nursery plots of broad leaf seedlings and probably two acres more devoted to conifers. About 13 acres were set out in permanent plantation in the spring of 1905. The varieties were maple, cottonwood, ash, elm, birch, willow, Russian poplar, spruce and Scotch pine. One hundred and sixty acres adjoining the present nursery site, as I said, have also been transferred to the nursery station. The land at present is prairie, but will be brought under cultivation.

By Mr. Shaffner:

Q. You would not recommend the cottonwood?

A. Yes on heavy soil where quick growth is desired.

Q. Is it more durable than the Manitoba maple?

A. It is a better tree for fuel on account of its more rapid growth.

By Mr. Adamson:

Q. Does it last longer than the Manitoba maple?

A. I do not think so, probably about the same time.

By Mr. Burrows:

Q. It grows to a great size?

A. Yes.

By Mr. Schell (Oxford):

Q. How do you distribute your trees?

A. We distribute to the prairie sections of the west only.

Q. You do not send to people in towns or cities ?

A. No. We occasionally have endeavoured to work on those lines. That is to say schools often wish to have plantations, and we give them trees when the application is signed by the chairman of the school board and is otherwise all right. We have not given trees to cities because they are apt to be cut down as new buildings are added. There have been applications for trees for park purposes, and there was one, I think, in the case of Lethbridge and Medicine Hat, in which something was done by special agreement with the council, but there has not been any great development in that way. We did propose that we would assist in the giving of seed, and the inspectors would be able to state what kind of trees should be planted and so on. In that way assistance might be given but it is not our object to grow ornamental trees for distribution.

By Mr. Lake:

Q. Have you found that any considerable proportion to whom you supplied these trees failed to look after them?

A. We have some cases.

Q. Are they only a small proportion?

A. Yes a very small proportion. In some cases we have refused to furnish them with trees again for that reason. If it were not for the inspection carried on I think there would be many more such cases. The inspectors go round and remind them of the agreement in which they have undertaken to care for the trees and are not performing the obligation. I certainly think the inspection part of the work is most important.

By Mr. Lewis:

Q. Do you supply all that ask ?

A. We have been able to supply every applicant so far where the inspectors' reports state that ground has been properly prepared, but not always with the number they asked for.

Q. Do you supply them twice?

A. Yes, if they take care of their trees and wish to extend their plantations we do what we can to let them go on. If they have not done so we refuse to supply them with more trees.

By Mr. Lake:

Q. Have you supplied any of the conifers?

A. We have not done so yet.

Q. When do you propose to do so?

A. It takes a great deal of time to raise conifers. We have only been started a short time and the conifers are hardly large enough yet for distribution. It is possible that in the future we may be able to make a distribution of some varieties of conifers; but owing to the difficulty of obtaining seed and the great care required in growing them in the nursery as well as in planting out, we cannot hope to make their distribution as general as we have in the case of the broadleaved seedlings.

Besides the stock heeled in for distribution, which I spoke of amounting to about two millions, we estimate there are at the nursery 1,200,000 one year old ash. As I said, the ash have to remain in the nursery two years. The Manitoba maples, which grow faster, we sow in the spring, take them up in the fall, heel them in, and distribute them the next spring. Of one year elms there are 300,000 in nursery rows. Seedling and transplanted conifers 500,000; making a total of 4,000,000 at present at the nurseries including those that are to be sent out this spring.

By Mr. Findlay:

Q. Excuse me, you speak about elm, is that the same elm as we have here?

A. It is the *Ulmus Americana*, the ordinary American or white elm.

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Q. Is it the rock elm?

A. It is not the rock elm that we have.

By Mr. Smith (Oxford):

Q. Have you got any hardy varieties for crossbreeding in the Northwest, experimenting along the lines that Burbank has operated, for instance?

A. That is work that will have to be done at the experimental stations, we do not propose to engage in that work.

By Mr. Kennedy:

Q. Will any of those trees grow from slips, from their own cuttings?

A. Oh, yes, some of them will.

Q. Could not the farmers be instructed in raising trees from their own slips, keeping the stock growing all the time?

A. The cottonwoods will grow that way, and the willows also. Of course the farmers could do as you suggest.

Q. I would like to ask about those elm trees, have they been a success on the prairie where it is not well watered?

A. Yes, we have found that the elm we have will grow where it is properly cultivated. The information given me by the inspectors is that it will grow if there is proper cultivation. We find that even in southwestern Alberta those who relied on irrigation were less successful with these trees than those who depended on working up their soil well.

By Mr. Lewis:

Q. Without desiring to interfere with the order of matters, will you kindly explain that map on the wall at which we are all looking?

A. I think I have about finished now my remarks in connection with the tree planting and the forest work, and with your permission I will now go on to the other part of what I was announced to speak on.

By Mr. Smith:

Q. What conifers are hardy there, the white spruce?

A. Yes, the white spruce is hardy.

Q. Is that the only one?

A. No, we have the Scotch pine growing there very well with the native larch, which grows splendidly.

Q. Does the tamarack grow there, is the larch tamarack?

A. Yes.

By Mr. Lake:

Q. Do you consider the larch the best of those trees? Is it better than spruce?

A. Undoubtedly; I think the larch will be one of the best trees than can be grown, the larch for a conifer and the ash for a broadleaved tree, are the two trees that, in my opinion, are the best suited for the country. The larch or tamarack, as you know, is good wood for fuel and better than spruce for railway ties, fence posts, &c.

By Mr. Kennedy:

Q. It will grow on the high ground?

A. Yes.

By Mr. Lake:

Q. Will it grow as rapidly as spruce?

A. It will grow very rapidly, if you have been at Indian Head you will have seen it there, it has grown very far above the spruce.

By Mr. Smith (Wentworth):

Q. Is the European larch the same as the tamarack?

A. It is very much the same.

By Mr. Wright (Muskoka):

Q. Will the ordinary white pine grow there?

A. We are going to try it, it may grow, but we have not tried it yet. We will try all these various species of trees later on and hope to be able to give reports upon them.

By Mr. Jackson (Selkirk):

Q. Are there any hardwood trees—can you name a single hardwood tree—whose home is in Ontario that will grow in the west?

A. I would not like to say whether it will or not—

By Mr. Wright (Renfrew):

Q. Does not the oak grow there?

A. The oak grows in the Pembina mountains and elsewhere in Southern Manitoba.

Q. Have you experimented with the Ontario oak to see whether it will grow there?

A. Trials have been made at the experimental farms, but they have not been successful.

Q. Then the Ontario oak will grow in Manitoba, for instance we have scrub oak in Manitoba, but is that the Ontario oak?

A. You have to discriminate there—

By Mr. Jackson (Selkirk):

Q. Just the same as we have the maple in Manitoba, but it is not the same we have in Ontario?

A. It is not the white oak or the red oak you have growing there.

Q. You cannot grow them there?

A. The trials before referred to at the experimental farms would indicate that these varieties will not grow there.

Q. Your experiments have not shown that they will grow there?

A. We have not made any tests yet.

Q. I have reference to hardwood timbers?

A. Well, we will be doing that later on.

Now, if there is any question that any gentleman wishes to ask I will be glad to answer. I do not wish to pass on to another subject if there are any further questions.

By Mr. Smith (Wentworth):

Q. Do you find the seedlings hardier if grown from seed taken from trees in Manitoba, hardier than from seed brought in from outside?

A. Yes, they are better.

By Mr. Wright (Renfrew):

Q. That oak I saw growing on the banks of the Rainy river is not that the same as the oak in Ontario?

A. It looks to me to be the same.

By Mr. Burrows:

Q. The ordinary white oak is only grown in the eastern districts?

A. There is a difference between that oak and the western oak; I am not speaking of the Rainy river district.

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By Mr. Lewis:

Q. You are sending out trees to be planted afterwards on the prairies ; can you give any reason why there are no trees growing there now ? If the trees will grow there when you send them out why are there not trees growing there naturally ?

A. There have been trees growing on many parts of the prairie although there are no trees there now.

Q. But why is that ?

A. The prairie fires have swept over there.

Q. Why would that not be the same way in Ontario, where it is covered with forest ?

A. I have seen country in Ontario practically growing into prairie, but there is a reason why it should not do so to the same extent as in the west. There is more rainfall here, you have not fires sweeping over large districts in Ontario as they have there.

Q. You will see in the Saskatchewan valley and in the valleys of other rivers the land is covered with trees, how is it that they have not been swept clear ?

A. It is because the fires have not gone into the valleys, they have not swept through the valleys as they have over the prairie. The valleys have been protected by the rivers. I think that is the reason.

By Mr. Burrows:

Q. You made a statement some time ago that one of the important factors in connection with the timber reserves was the valuable fur that they contained. Now, I understand, that the local government has charge of the regulation of fur-bearing animals, of the catching and selling of furs ?

A. That may be, but in the Act that we passed last session there was a proviso which stated that as far as the Dominion Government had power—without pretending to give you the legal definition of that, I would say that the government stands in the same relation as the owners of those reserves, as a private person would. We will have to work under the provincial laws, no doubt, for the punishment of offenders, and with regard to the close season, perhaps, just the same as we have to work under the provincial laws for the punishment of violation of the law with reference to setting fires. It seems to me that is the way it works out, that the government just takes the position of a private individual as owner of these reserves.

Q. And the game on the reserve ?

A. Yes, I think, that the Dominion government would own the game, but in the north country there is a vast territory outside of the provinces where the game would be a most important matter to be looked after, and my idea is to make these forest reserves also preserves or fur farms, where we would raise fur-bearing animals, and perhaps improve them. Undoubtedly we have an asset in the northern country even as far as the Arctic in the fur-bearing animals which will increase with the value of furs, and the protection of these animals is worthy of careful attention.

By Mr. Wright (Renfrew):

Q. I just want to draw your attention to this fact that the oak flourishes around Fort Frances on the Rainy river ?

A. Yes.

Q. And when you leave Ontario and go to Oak Point (Point de Chene) in Manitoba there are oaks to be found also in Manitoba ?

A. Certainly there are oaks in the Pembina mountains, but there is no oak after you get far west. I do not think there is any oak west of the Province of Manitoba, certainly not far west of the boundary of that province.

MR. LAKE.—Between Broadview and Whitewood is where you see the last.

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By Mr. Kennedy:

Q. Can you explain why it is there is oak on Vancouver Island and none on the mainland?

A. It is a question that is pretty hard to answer.

Q. I am merely making the statement that is the fact.

A. Oh, yes.

By Mr. Herron:

Q. Would it come under your department to protect the game in the Northwest or to recommend protection for game. There is great need of it in the foothills of the Rocky Mountains where the Indians, particularly the Stony Indians, are exterminating the deer and other game?

A. Yes, the Act that was passed last session with reference to the forest reserves makes provision for that. It says: 'That in order to protect and improve the forests for the purpose of maintaining a permanent supply of timber and to maintain the conditions favourable to a continual water supply and to protect, as far as the Parliament of Canada has jurisdiction, the animals, fish and birds within the respective boundaries of such reserves,' &c.

Mr. HERRON.—Just for the information of the committee, I might say that this time last year inside of four weeks, there were over 400 deer killed by Indians near where I live. They slaughtered 400 of them within a radius of perhaps 30 miles.

Mr. BARR.—What kind of deer?

Mr. HERON.—White tail and black tail.

Mr. STEWART.—I am sorry but that district is outside of the forest reserves and the Act would not apply there.

CEREALS GROWN IN HIGH NORTHERN LATITUDES.

Before I go any further let me say this: A few years ago, I think it was three years since, I made a trip from Edmonton to the Peace River country, going up the Athabaska and up Little Slave river to Slave Lake and then across to the Peace river. Although my object was, as it was last season, to ascertain the facts regarding the timber of the country, I thought it wise to take notes regarding the agricultural possibilities of that region, and I have here some samples of the wheat grown there. One sample is from Lesser Slave lake. Here is another that came from the Peace river, and there is also some wheat that came from the Roman Catholic mission on Lesser Slave lake.

By Mr. Lewis:

Q. Will you please point out those places on the map?

A. Yes, I will do so gladly.* I would also say that I have here some hulled barley which also came from Lesser Slave lake and some tobacco from the Peace river country. I am afraid, Mr. Lewis, it will be very difficult to see at any distance the points which I would like to indicate on the map. Here is Edmonton and here is Athabasca Landing. On that trip to the Peace river I went up the Athabaska and then up Little Slave river to Lesser Slave lake, and then from Lesser Slave lake to this point at the end of the lake and then across to the Peace river landing. That is where the grain was grown which I have just exhibited to the committee. The latitude, as near as I can find it on the map, is 56 degrees.

AREA OF MACKENZIE RIVER BASIN.

Now, during the past season I undertook a trip for a much longer distance down the Mackenzie river. This map will show the timber areas as far as the data in our possession enables them to be outlined. You will see here what are called the bar-

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ren lands and here is what is called the northern forest area. Now that is supposed to be the limit of the northern forest growth.

Q. What is the latitude?

A. It is in various latitudes. Up here it is $67^{\circ} 45'$. Here is what are called the 'barren lands.' This is more or less wooded. I took a trip through this country to ascertain as far as I could the character of the timber. This line represents the northern forests. It is not densely wooded, and yet it is not prairie. This is the prairie region.

By Mr. Burrows:

Q. It is very small in area?

A. It is very small indeed compared to the whole region. The great river I am pointing out to you is the Mackenzie. The area of the Mackenzie basin is 451,400 square miles. To make a comparison between it and the St. Lawrence above Montreal, taking in all the great lakes and all the country on both sides of the boundary line within this watershed and the area of the latter is only 368,900 square miles or nearly one hundred thousand less than the area drained by the Mackenzie. I might put it in another way. Here is a large area which as you will notice takes in the main Saskatchewan as well as the two branches of that great river. It includes the whole of what is known as the fertile belt and yet it is scarcely one-third of the area drained by the Mackenzie river. I have the figures as nearly as they could be collected and the area drained by the Saskatchewan, including the main stream and both branches, is but 159,000 square miles, as against 451,000 drained by the Mackenzie river.

Now, as to my trip, I went to Edmonton and from there drove out to Athabaska Landing, a distance of about 100 miles. Then I took the steamer and went down about 165 miles to Grand Rapids. As I go along I will try and tell you what I saw as I proceeded through the country. It may be interesting or otherwise, but perhaps it will be the best thing for me to do. At Pelican rapids we saw a burning well. The government a few years ago caused several wells to be sunk in that country for oil. One was near Edmonton—at Victoria, I think.

COURSE OF TRAVEL—A BURNING GAS WELL.

They went down some 1,700 feet and the casing gave way and they could not go any further. They put down one also near Athabaska Landing which practically the same result. At Pelican Rapids at a depth I think of about 800 feet, going through several feet of tar sands they struck a flow of gas that was so strong as to interfere with further work. That gas well was burning when we were there.

Below that, we went to Grand Rapids in the steamer, and from there on to Fort McMurray, which is just here (indicating on map) at the entrance to Clear Water: that is 245 miles from Athabaska Landing. From Grand Rapids to Fort McMurray, a distance of 85 miles, we had to take scows. It took us longer to go that distance of 245 miles than it did all the rest of the way to the delta of the Mackenzie river. The water was very low and the steamer was aground more than half the time.

ASPHALT,—PROBABLE EXISTENCE OF OIL WELLS.

The reason of their boring for oil in that part of the country is owing to the presence there of vast areas of what is known as 'tar sand,' it is asphalt. This petroleum that has escaped, has oozed out from the sands, and is left in a condition something like that (exhibiting sample) with a strong smell of tar. There is a very large area of that which has been reported on by the Geological Survey, and it is quite possible that oil wells of very great value will be found there. There is certainly a very large area of it that shows the existence of petroleum. It has been analyzed and the proportion of petroleum it contains ascertained which is pretty large. This country all the way down to Athabaska lake here (indicating on map) is what I would say

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second class land. There are plots in it that are poor. I saw wheat growing at Pelican rapids and also vegetables growing which were very good, but it is a country of muskegs with spruce timber along the streams. There is a good deal of muskeg with portions of good land, but it is hard to say until it is explored what portion of it will be fit for settlement. We had a steamer from Fort McMurray down the river to Athabaska Lake, and down Slave river, passing the junction of the Peace river here (indicating on map). There is an obstruction in the Slave, and you have to make a portage there of sixteen miles; but from there we got another steamer, the *Wrigley*, that took us down to Great Slave Lake, across that lake and down the Mackenzie and up the Peel river to Fort MacPherson, a distance of 1,300 miles. This steamer drew 5½ feet of water. The whole distance from Athabaska landing to Fort MacPherson at the delta of the Mackenzie is 1,854 miles. I think Professor Macoun mentioned that I had seen wheat growing at a point very far north.

GROWTH OF WHEAT AT FORT PROVIDENCE.

On July 15 I was at Fort Providence, I had seen grain before at other points that I am not mentioning here. Here is Fort Providence (indicating on map) in latitude 61 degrees 25 min., or about 550 miles farther north than Edmonton. That is where, on July 15, I saw the wheat in milk that was spoken of the other day. I also saw potatoes in flower, peas fit for use, tomatoes, turnips, rhubarb, beets, cabbage, onions, &c., and fruits such as strawberries, which were ripe at the time, raspberries, currants, gooseberries, and saskatoons. This was a small field of wheat of not over two acres I should say, at the Roman Catholic mission. I took a photograph of it but unfortunately it did not turn out very well. There was a very fine field of potatoes and a part in wheat, and the wheat was headed out and the grain fully formed on July 15. It had been, I understood, sown on May 20. I was very anxious to know whether that wheat had ripened or not this year, and fortunately, within the last few weeks Mr. Laird, from Winnipeg, who accompanied me down on the *Wrigley*, and who saw the field of wheat, came into my office a few weeks ago and told me that when he returned on the boat he went out to see the wheat on July 28, and the wheat had then been cut.

By Mr. Smith (Wentworth):

Q. Did those in charge say that it was an ordinary occurrence for wheat to ripen there?

A. I understood they grew wheat frequently, but I did not have an opportunity of seeing anyone that could give me much information about it.

By Mr. Burrows:

Q. Did you find out whether there is any considerable extent of land that could be cultivated in that district?

A. That was difficult to ascertain in passing along the river. The whole stretch of country along the Mackenzie river from Great Slave Lake to the delta of the Mackenzie is nearly all alluvial soil, very similar in appearance to the soil of the North-west prairie.

My object in going down was to investigate and ascertain the timber resources of the country. I do not want to say, and I do not want it to go out as my opinion, that the whole of that district is capable of growing wheat; I would not want to say that all the country was as good as it is along the rivers; I rather think if you go back a short distance from the river very frequently you will fall into muskeg, but you will get another tributary stream, perhaps, and along the banks of that stream you will find alluvial deposits. Wheat has been grown further north than Fort Providence, not very much farther north, but farther down the river at Fort Simpson it has been grown. I do not know of any farther north. All the way down and particularly at Simpson we found the same vegetables as at Providence. Here is Fort Simpson at the

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junction with the Liard river. The principal tributaries of the Mackenzie are the Liard, the Peace and the Athabaska.

By Mr. Lake:

Q. What height is Providence above the sea level?

A. I am afraid I cannot give the exact figures; they can be obtained. The elevation of Great Slave lake is given at only 200 feet, and Fort Providence is a short distance below on the Mackenzie river, so the elevation of Providence will be a little less than 200 feet above the sea.

By Mr. Smith, (Wentworth):

Q. I suppose that steamer makes several trips during the season?

A. One trip a year.

Q. How long does it take to make the journey?

A. I was going to say that I left Athabaska Landing on the 8th of June and reached Fort MacPherson on the 21st July. It was the 2nd of July when we left Fort McMurray. The water was very low otherwise we would not have taken so long a time as three weeks. We went from Fort McMurray to Fort McPherson in 19 days. We were about a week getting across the portage on Slave river where an obstruction of some 16 miles has to be overcome. We were there just when the water was coming down from the mountains. It is a very different thing going back and I did not care to return by the same route. One reason was that I did not care to journey up stream, and the other that I preferred to see the new territory. I hired some Indians at Fort MacPherson and crossed the divide of the Rockies. I descended a stream flowing into the Porcupine river and then went on down in a little bark canoe for a distance of about 200 miles. It was the most trying trip I ever had, occupying between four and five days and necessitating my remaining all the time in the one position. I was therefore very glad when the opportunity came to get out and stretch my limbs. I was compelled to sit behind an Indian in a little canoe which was more like an Eskimo kayak than anything else. I went down to Fort Yukon in Alaska and from there got a steamer and proceeded to Dawson City.

LOCAL SUPPLY OF SALT.

An interesting fact which I noted in my journey was that the Hudson Bay Company do not import salt, but get their supply of that article from the Salt river, about 25 miles below Fort Smith on the Slave river. Now any of you that have read Sir Alexander Mackenzie's narrative of his discovery of the Mackenzie river will remember that he speaks of burning banks near the junction of the Great Bear river with the Mackenzie at Fort Norman. Those fires are still burning. Sir Alexander Mackenzie descended the river in 1798. The banks were burning, as he said, and I saw them burning for about a mile in distance at a point about four or five miles below Fort Norman.

A BURNING COAL MINE.

By Mr. Burrows:

Q. There are coal seams in the river bank, are there not?

A. Yes, the fire is burning in the seams of coal or lignite.

By Mr. Lake:

Q. Is that supposed to have continued for a hundred years?

A. Yes, they say so, but not in the same place. You will see traces all along the banks. For a distance of 25 or 30 miles there are evidences of the fire in the charred clay.

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By the Chairman:

Q. In what condition is the salt found that you spoke of?

A. It is found in the bed of the stream when the water goes down. It is granulated and coarse. It is not rock salt, but there is rock salt in the Bear river I understand.

Now at Fort Good Hope, within a few miles of the Arctic Circle in latitude $66^{\circ} 16'$ and 970 miles farther north than Edmonton, I saw cabbages, onions, potatoes, &c., growing in the gardens.*By an Honourable Member:*

Q. What kind of specimens were they?

Q. I was too early to see.

By Mr. Chisholm:

Q. What time does the first frost visit there?

A. I could not say, but they told me they did not expect any frost until about the first of September.

Mr. Smith (Wentworth):

Q. They claim that they grow crops of potatoes every year?

A. They can produce them as far north as the Arctic Circle.

EXTERMINATION OF FOREST ANIMALS.

By Mr. Herron:

Q. What is the nature of the fur-bearing animals from Athabaska north?

A. Well, the country is so large and there is such an extent of it that what is common in one part will not be common in another. Beaver were very common a few years ago through a large extent of that country. I understand they have become almost exhausted in many districts. I have found in the far north that the marten was the principal fur-bearing animal.

By Mr. Wilson (Russell):

Q. Did you see any musk ox?

A. No, they are confined to the far north on the barren lands more particularly. The wood buffalo are confined to the district around Slave lake and the Peace river. It seems a great pity that they could not be preserved. Their numbers have dwindled to about 150.

By Mr. Burrows:

Q. Are they being killed out?

A. I could not say. I have heard that they were some killed at times, and I have no doubt there are.

DECREASE OF INDIAN POPULATION BY DISEASE.

By Mr. Jackson, (Selkirk):

Q. What about the Indian population there?

A. The Indians are decreasing. At Fort Simpson, which is a prominent post of the Hudson Bay Company, there are not the same number of Indians that there were about thirty years ago.

By Mr. Barr:

Q. What is the number at Fort Simpson?

A. Well, the Indians are migratory in their habits. They move about from place to place and especially during the hunting season. I will be able to furnish that in-

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formation later. I have it here but it will take some time to find it. The records of the Hudson Bay Company at Fort Simpson show the following—the population in 1827, it goes back to that date, was 868 souls. In 1889 it was 234, a decrease of 634.

By Mr. Wilson (Lennox):

Q. Was that reduction caused by dying off or by the movement of the Indians to other parts of the country?

A. Just as I say they are so migratory. I would not place very great reliance on those figures as showing the extent of the decrease, but there is no doubt they are decreasing.

Q. But you ought to have some knowledge from what you heard when you were there whether they are dying off or whether they are moving from place to place?

A. Well, I know, of course, they are dying.

Q. But that great decrease must be accounted for one way or the other?

A. The decrease, judging from appearances, and from what I saw, is that they are decreasing from death. They are in a transition stage. The Indians formerly lived outside, now they are building their little huts and they get in them in winter, they have little box stoves, and they are extravagant in fuel as they are in everything else, they are extravagant in heat; perhaps a dozen of them will get in one of these little huts and they will have it so hot that a white man cannot stay in there, but they remain there breathing the most frightful air, and the result is that consumption is everywhere visible, the Indians everywhere seem very susceptible to that disease. I believe that the records in the Grand river where they are past that transition stage and where they have become accustomed to dwelling in houses, show that they are increasing. But throughout the entire district consumption was prevalent, you could see it everywhere among the Indians in the far north. So much so that in a report I have made I have strongly recommended that the Parliament of Canada should certainly do something to subsidize or to contribute towards the cost of a few physicians to go down into that country and administer to the needs of those Indians.

By Dr. Barr:

Q. Would not carpenters to build them proper houses be better?

A. I could not say as to that. But in every Indian settlement that we visited, when I joined the Indians at Fort MacPherson and went across the mountains with them, we visited several of their camps and in each case we found sick people wanting to know if we had medicine. 'Have you any medicine' was the cry of the sick everywhere. Some of them were the victims of chronic disease that perhaps a simple surgical operation would cure, but they were condemned to live there year after year without any relief. I asked some of the missionaries about it, and one of them who had some medical knowledge told me that he thought appendicitis was just as prevalent there as it was here, and that many of the cases could be cured by an operation, and he wished he had enough knowledge to operate. In that whole country there was not a single physician for a distance of 1,500 miles.

Q. But does not the government furnish physicians and medicine to the Indians?

A. Where the Indians are under treaty there are physicians employed by the government, but these Indians are not under treaty and therefore they have no physicians. In fact, going down the Athabaska river we had a young man take sick. We had no chance of doing anything, there was no physician anywhere and he died in about eight days, a case probably of appendicitis. When I got to Fort Good Hope I expected to see a young man there but found that he was very sick, they could not do anything for him he was so far gone and died the next day. There was no chance of getting medical aid at all for him; no medical aid can be obtained there except such as the missionaries are able to give. I do not know whether the disease of this young man was such that a physician could have done him any good, but he was a young

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man who had gone down there to work for one of those companies. This is a very sad state of affairs.

By Mr. Smith (Wentworth):

Q. What about the value of the forest in this district for timber, lumber?

A. That is an important question to ask. The object of my journey was to ascertain as far as possible whether it was correct or not that the tree growth extended as far north as supposed. I found spruce, poplar and birch growing right up to the delta of the Mackenzie.

Q. How large would they grow?

A. I do not mean to say that there are any large timber limits so far north as that, but from the appearance of the timber lying on the bars of Great Slave lake and along Slave river and perhaps further down beyond where the Liard joins the Mackenzie the size of the timber lying on the shores gave evidence that up these streams, that is up the Peace and up the Liard, there must be very good timber.

Q. What kind of timber?

A. There is cottonwood and spruce, very large cottonwood.

Q. Is there much large spruce?

A. I saw spruce probably three feet at the butt but many are smaller, drifted up on the shore. There was enough timber up along the bars and on the shores there to run a large mill for a considerable time, for several years. Now, I will speak of what I saw along the river itself. There is spruce, principally spruce, that is except the poplar, all the way down to the delta (indicating on map). Right at this point—Point Separation—at the delta of the Mackenzie, I saw timber trees from 16 to 18 inches in diameter. The houses at Fort MacPherson are built with timber.

Q. Log houses?

A. Log houses, and one, viz., the church was built of sawn lumber. Many of you who have travelled in the north country know what a lobstick is. It is generally a spruce tree which has been trimmed of its branches so as to make it a conspicuous object which can be seen at a long distance. These lobsticks are used to commemorate some particular event in that particular district. At Point Separation there are two of these trees which were marked by Sir John Franklin and Sir John Richardson when they separated; the place was called Point Separation for the reason that they separated there, Franklin going around this way to the north (indicating on map), and Richardson going around here, and you will remember the very difficult time he had. These trees must be 16 or 18 inches in diameter, but one of them is dead. The Indians say they made a cache there, and buried a lot of whiskey before separating. I doubt that very much because the Indians say they never found it.

Witness retired and the committee adjourned.

Having read over the foregoing transcript of my evidence, I find it correct.

E. STEWART,
Superintendent of Dominion Forestry.

DAIRYING, FRUIT, EXTENSION OF MARKETS, COLD STORAGE.

COMMITTEE ROOM No. 34,

HOUSE OF COMMONS,

OTTAWA, Wednesday, February 20, 1907.

The Select Standing Committee on Agriculture and Colonization met at 10 o'clock a.m., the chairman, Mr. P. H. McKenzie, presiding.

Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner, attended at the request of the committee and submitted the following information in reference to the branch of the Agricultural Department under his care:

Mr. Chairman and Gentlemen of the Committee.—I am pleased to come before you again to resume the discussion of some of the different lines of work which are carried on by the branch of the Department of Agriculture over which I have charge. I see the notice mentions that I am to speak of dairying, fruit, extension of markets, and cold storage. That is rather a wide range of subjects, and it has been suggested to me that in view of the interest which legislation now before Parliament has attracted to the question of cold storage, I should give that particular phase of our work special attention, and I have therefore prepared myself along that line. I would like, however, first, to briefly refer to one or two other phases of the work before coming to the question of cold storage.

DAIRYING.

Taking up the division of dairying first, I need not point out to the members of the committee that the past season has been a very successful one, from the producers standpoint at any rate. Prices for cheese have been higher during the past twelve months than ever before in the history of the trade. I think we are safe in concluding that we are not likely to see as low prices for cheese, in the near future at any rate, as we have in the past. I believe that as a result of improved quality the value of cheese as an article of food has become better appreciated, and that it will bring higher relative prices, compared with meat and other food products, than heretofore. This does not mean that the prices of all these commodities may not go lower than they are at present; that all depends on general conditions.

QUALITY IMPORTANT.

There is one point in this connection which should not be overlooked, and that is the question of quality, which becomes more important as the prices go higher. The consumer is more critical when he has to pay from 12 to 20 cents per pound for cheese than he is when he pays only one-half that price. A difference of one-half cent a pound on six-cent cheese is equal to one cent a pound on twelve-cent cheese, so that we have to redouble our efforts, as the price of cheese advances, to keep up the quality, which, as I have said, becomes of more importance than ever before. Our cheese trade is undoubtedly showing the beneficial results of the improvement in the methods of handling, beginning at the factory, through the iced cheese car service, and the better facilities on the steamers. These

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improvements mean that a large percentage of our cheese is now being landed on the other side without that objectionable 'heated' flavour which has been a drawback in the past, and the consumption has been encouraged enormously as a result. That is the opinion of leading men in the trade on the other side, and it is one of the factors which has contributed to higher prices during recent years. We are improving the flavour of our cheese by reducing the temperature at which they have been handled.

COOL CURED CHEESE.

The cool curing of cheese is a very important factor in this connection, and in referring to that work I will only say this: that the movement has now got so well started and has made so much headway through the work of the government cool-curing rooms, during the past five years, that no further work on the part of the government seems to be necessary in that direction. I would like, if I may be permitted, to read a letter that came to me from one of the leading importers in this connection. It is dated at Manchester, December 18, 1906, and is as follows :—

'Mr. J. A. RUDDICK,

'Department of Agriculture.

'DEAR SIR,—On going through a line of white and coloured cheese to-day, September made, all Western goods, we wanted a few hundred boxes for a very particular buyer. We got him fixed up, but he was not altogether satisfied with the quality, and kept repeating that they were not up to our usual standard. On going to the coloured lots we picked 400 or 500 boxes without turning down a factory, and our buyer expressed the pleasure that it was to have cheese of this kind offered; every lot was as near perfect as you can get cheese.

'On going into the matter to try and find the difference we at once saw that the coloured had been cured in a government cool-curing room at Brockville, while the white had been cured in the ordinary way.

'If any of your farmers had been in our warehouse to-day they would have had an object lesson in the value and importance of having their cheese all cured in the same way. In our minds it makes a very much bigger difference than people imagine, and if this plan was adopted generally Canadian cheese would hold a very much higher place in the opinion of the trade than it does to-day.'

By Mr. Sproule :

Q. Does that mean that you cannot make a private curing room equal to the government one?

A. No, it only means that it is a question of temperature, and a private room, if kept at the same temperature, would produce the same results. Of course this gentleman referred to the cheese taken from the Brockville cool-curing room because they were so branded.

By Mr. Smith (Wentworth) :

Q. The writer of that letter seems to be comparing two different kinds of cheese, the coloured and the white?

A. That only refers to the fact that he had a large consignment of cheese which came from several different factories, and he found that one lot of cheese was without fault, and the others were not.

By Mr. Sproule :

Q. What about cheese with bottles in them?

A. I want this to go down on the records, that this cheese was made at Gananoque, and was sold by Mr. J. B. Wilson of Gananoque to the Brockville trade. The cheese

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in question was being made about eight miles from Gananoque. There was a girl, a connection of the manufacturer of the cheese, who lived at Pulaski, New York, who was visiting the party who made the cheese for several weeks. You take a girl of that age having very little to do and you can easily understand—she wrote a letter, dating it at her own home, signing her own name, and requesting an answer to come to her at her own home. She put that letter into a bottle and this bottle was put in the centre of a cheese, and that is the whole story in a nutshell. The cheese to which reference has been made was Canadian cheese, but the girl who wrote the letter was a Yankee girl who was visiting at the Canadian home where the cheese was made, and that is the whole story.

By Mr. Blain :

Q. Have you any figures showing what proportion of our export cheese passed through cool-curing rooms ?

A. I have not got exact figures ; of course a comparatively small proportion was put through the government cool-curing rooms, but a large number of the private factories have been equipped with cool-curing facilities ; I am not prepared to say how many. Some are partially improved and others are fully equipped, but in the Central Ontario district there are about fifty factories that have cool-curing rooms upon their own premises.

By Mr. Maclaren :

Q. What percentage of cheese factories in the whole Dominion have them ?

A. I think about one hundred factories have adopted the cool-curing system, but that is not the end of it, for in a few years it will be the exception rather than the rule to find the factories without cool-curing facilities.

Q. I think it will be a good idea to have that letter published.

A. It will be published in the report.

Q. It should go into the press.

A. It has been published already.

Q. It should be sent out to the dealers and manufacturers of cheese and butter ?

A. It has been published pretty generally, but I cannot say how many have read it.

I would like, if the committee will permit me, to say that I take a great deal of personal pride in this matter of cool-curing of cheese. I have never lost an opportunity—I do not think I have scarcely addressed a dairy meeting for the last five years that I have not referred to this question. I have stuck to it until the people have been almost tired hearing it, but I believed that was the only way in which to get this thing going, by continually hammering away at it, and I believe we have the movement so well started now that it will require very little further effort on our part.

PLANS FOR COOL-CURING ROOM.

I have also taken a great deal of pains to devise the cheapest and most effective system for putting the cool-curing system into working order in connection with factories, and the plans which we have published for the purpose are being adopted by factories all over the country where they are carrying out the idea. The 'Ruddick System' for cool-curing rooms is being generally adopted.

By Mr. Sproule :

Q. How many government cool-curing rooms are there in operation ?

A. There will be none in operation this year.

Q. What did they do with the ones they had ?

A. The one at Brockville has been rented, and the one at Woodstock has also been rented for the storage and handling of cheese. The ones at St. Hyacinthe and Cowansville have not yet been disposed of. They are yet under offer, and there have been

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some negotiations. At Cowansville we are negotiating with the Canadian Pacific Railway, and other offers or communications have been received in regard to the one at St. Hyacinthe.

By Mr. Wilson (Lennox):

Q. Are they to rent or for sale?

A. Either to rent or to sell.

Q. But you prefer to sell?

A. Well, we are not particular, there has to be a special Act of Parliament to enable us to sell. We have rented them on better terms than selling: we got \$350 a year for the one at Woodstock and \$300 for the one at Brockville.

Q. What did they cost?

A. The Woodstock room cost more than the Brockville because it was fitted in the first place with a mechanical cold storage: it cost, I think, about \$12,000. Of course, a great deal of that was experimental work, we put in three special chambers for controlling the temperature, and a great deal of the work of construction was experimental. In the first place there was absolutely nothing to guide us, it was a new line of work entirely, and they were made somewhat more expensive than we now find is necessary. That is one of the things we have learnt in practice from the experiment.

Q. What is the cost of the cool-curing rooms that you recommend?

A. Cheese factories can fit up their cool-curing rooms for from \$600 to \$800. They do not require to insulate very much, except the ice chambers, and in most cases they can put the ice-room inside the present curing room. The Brockville cool-curing-room cost, I think, about \$8,000, but I would not like to say definitely off-hand.

THE BUTTER TRADE.

Our butter trade has not shown any very marked feature during the past season; there has been a good demand, and no serious difficulties have been pointed out, and there have been no serious objections to the quality. The quantity shipped has been somewhat less than in 1905 because of more milk being diverted to the cheese factories on account of the higher relative price for cheese.

By Mr. Sproule:

Q. Have you the quantity of cheese exported last year and the year before?

A. Yes, the figures are as follows: For the fiscal year ending June 30, 1905, 215,733,259 lb. For the same period ending June 30, 1906, 215,834,543 lb. There was very little difference in the actual quantity of cheese shipped as between the two years. Of course, last year the value is greater by over \$4,000,000 on account of the higher price.

By Mr. Wright (Renfrew):

Q. I would just like to say this, that it was not altogether in consequence of the milk being absorbed in the cheese factories that the butter market was affected last year, but the demand for home consumption has been greater than I ever knew it in my life before.

A. There is no doubt about that, that is a factor we are apt to overlook—the home consumption is increasing enormously, not only on account of the growth of population, but the consuming power of the people of Canada is very much greater than it was a few years ago. That has an important influence upon our trade, much more so than we often realize. It may be of interest to the committee for me to state that the home consumption of dairy produce in Canada is of greater value than what we export. The only figures I can give on this point are those of the census year 1900. In that year the total value of the milk for direct consumption and that manufactured into butter and cheese was \$66,000,000, and the total value of our export of butter and cheese that year was only \$29,000,000, so that you will see that back in 1900 the home consumption was very much larger than the export. It is a very important fac-

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tor and I would like to say in that connection, it is a market that the dairymen sometimes neglect ; we have not catered to the home market as much as we should. I believe that the consumption of cheese in Canada can be increased to four or five times as much as it is now.

By Mr. Maclaren :

Q. How do you think the production was last year ? Has it not been decreasing on account of the expense of labour ?

A. Not on the whole ; it has in some parts of Canada ; but in the province of Quebec there is a big increase. There is also a big increase in the production of dairy products in the western provinces.

COW TESTING ASSOCIATIONS.

I would like also to refer to another line of work which we are making, or expect to make, a special feature of our dairy work during the next few years, and that is this matter of improving the dairy herds. We call it 'cow testing work,' and at present it takes the form of encouraging the organization of cow testing associations throughout Canada. During the past season we have had sixteen of these associations in operation, each consisting of twenty or more members, who agreed to take samples, to weigh systematically the milk of each cow for three days during each month, and to take samples for testing, which were tested regularly and the results published broadcast. Those of you who have read the agricultural press during the last six or eight months have seen the reports of the cow testing associations in the different publications. The sixteen associations referred to included 355 members, and tests were made of 4,522 cows. The annual or summary report of these tests is now being prepared and the results will be given in the report of the Dairy Commissioner's Branch.

Q. What are the names of the associations, and where are they located ?

A. There were three in Ontario, one near Ingersoll, one at Princeton and one at Brockville, and the others were in the province of Quebec, where they have taken up this work more rapidly than in the province of Ontario. I expect that within the next month or six weeks we shall have thirty of these associations organized, and I desire, just in a word, to point out what this means to the milk producers of Canada. I believe it is quite within the range of possibility to increase the yearly production of milk by at least 2,000 lb. per cow in this country. That will mean \$30,000,000, because there are over two million cows in Canada. This is a line of work which is well worth following up. It has been very successful in other parts of the world and there is no reason why it should not be so here. We may not be able to show as big a difference as they have in Denmark, where they have a somewhat different system of handling the cows, but I think we can show a big increase if the matter is taken up generally by the farmers throughout the country. That is all I intended to say regarding the dairy work.

FRUIT.

Another important division of the work of my branch relates to fruit, but, as your chairman has intimated, it is quite likely you will ask my very able assistant, Mr. McNeill, who is the Chief of the Fruit Division, to come before you and discuss some aspects of the fruit industry in more detail. There are two principal lines of work in which the Fruit Division is engaged at the present time, to which I will make reference. The administration of the Fruit Marks Act takes up a good deal of time and is an important part of the work. During the summer season we compile and publish a monthly fruit crop report. We have about 4,000 correspondents in different parts of Canada, and they send in reports of conditions and prospects for the crop during the month, which information is at once compiled, and by special arrangements with the King's Printer, it is printed in about three days, and is distributed all over the country. The

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fruit growers have spoken very highly of the value of these reports, and we propose to continue that work during the next season. There is, of course, a large amount of correspondence in connection with the fruit industry.

RE-MARKING APPLES AT PORTLAND.

By Mr. Wright (Renfrew):

Q. You have the Fruit Marks Act under your jurisdiction?

A. Yes.

Q. What about this matter that we hear so much about, of somebody changing the marks on the packages at Portland? Has that been brought to your notice?

A. Yes, it has. There has been no detail of it, so far as I know, given to the public up to the present time, and the committee might, perhaps, like to know just how that matter stands. Our fruit inspectors have been busy along Lake Ontario points during the shipping season and they got information in some way that certain shippers, who were sending their apples via Portland, would have representatives at Portland for the purpose of changing the grade marks on the barrels, at that place. As soon as I heard of this thing, I sent Mr. Moore, one of my assistants, to Portland to look into the matter, and this is what he found: He found that apples marked in this way,

Canadian Apples

Put up

by

No. 2

JAMES COYLE

Colborne, Ont.

(Variety)

were being re-marked by a representative of Mr. Coyle, at Portland, by the addition of the mark:

No. 1

XXX

at the bottom. In the first place I should explain that these apples were shipped on local bills to Portland, marked 'for export,' so that they did not have to pay duty, and that left them in the charge of the railway company. Mr. Coyle, or his representative, went there and approached the railway people, asking permission to put some further marks on the barrels; they also got the permission of the customs authorities to do the same thing. The officials say that they did not know anything about the Fruit Marks Act, and supposed it was shipping marks that he wanted to put on. Moreover, the customs take cognizance only of the number of barrels, and care nothing about marks.

Q. It is the American customs authorities you are speaking of?

A. The American customs officials. Mr. Moore stood beside Coyle's representative when he put those marks on the barrels.

By Mr. Smith (Wentworth):

Q. Did the man erase the mark 'No. 2'?

A. No, he did not. This (producing document) is an exact representation of the marks placed on the barrel.

Q. Were any of these apples marked 'No. 3'?

A. Yes, in that case No. 2 XX was added below. It looked like a clear intention to mislead. Mr. Moore telephoned me from Portland as soon as he got this information, and I took the matter up with the traffic officers of the Grand Trunk Railway, who at once issued orders that no further re-marking of apples could be allowed.

Q. Did you punish them at all?

A. No. Portland is outside jurisdiction of the Dominion Fruit Marks Act, but

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we think the original form of marking was in this case a violation of the Act, and we intend to test that, when there is an opportunity.

By Mr. Maclaren:

Q. How do you find that apples, when well packed, reach the other side, do they arrive in good condition?

A. Yes.

Q. I shipped some apples, specially packed, to Vienna and they went all right.

A. We have had apples specially packed sent half way around the world, and they arrived in good condition.

By Mr. Walsh:

Q. Why do you say that there was a substitution of 'No. 1 XXX' for 'No. 2,' when the mark 'No. 2' was not erased?

A. It was the way they were marked; there was an evident intention to deceive.

Q. Do the provisions of the Act prevent that? Does the Act specially forbid that?

A. The Act says that the package must be branded 'No. 1,' 'No. 2,' or 'No. 3,' according to the grade.

By Mr. Blain:

Q. Did your inspector notice that particular form of branding?

A. Yes, they had drawn attention to it.

By Mr. Smith (Wentworth):

Q. Have you inspectors in sufficient numbers in the apple districts to inspect all the apples that are shipped?

A. There is quite a large proportion now being inspected at the country warehouses; in fact all warehouses are under inspection.

By Mr. Wright (Muskoka):

Q. Does the Act specify the form in which the barrel must be branded?

A. The Act does not define any special form at all; I have not a copy of the Act with me, but it simply states that the apples must be branded in accordance with the grade as specified in the Act.

Q. You might provide a form?

A. I think that might be done by regulation.

Q. You have not done so?

A. It has not been necessary. That is the first time we have found anything of this kind.

By the Chairman:

Q. Has your attention been called to the fact that many of the apples exported via Portland this year have been frozen on the way to that port?

A. Yes, it has been represented to me that quite a number of cars have arrived at Portland more or less frosted.

Q. Could we do anything to assist the trade in that matter?

A. Well, I do not know that we could do very much, except that we might urge upon the railway companies to provide better facilities. I am somewhat doubtful if we shall ever avoid a difficulty of that kind until the railways are made responsible for the loss.

By Mr. Maclaren:

Q. What kind of cars were the apples that were frozen shipped in?

A. Refrigerator cars.

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By Mr. Schell (Oxford):

Q. Most of the refrigerator cars have chambers for putting stoves in?

A. Yes.

Q. And they are giving special attention to looking after the stoves at the different divisional points. The Grand Trunk cars have not these chambers, and unless these chambers are put in there, with a view to putting stoves in, it is very difficult to get anything done in the way of heating the cars. I think that the government might very well take up that question, and with a reasonable amount of cars there is no reason, to my mind, why these cars should not be so equipped that apples might be sent through in absolute safety.

A. Have you experienced any difficulty with overheating where stoves are provided?

Q. No, I have not experienced that.

A. That has been a subject of complaint in many cases, that the apples have been overheated, and that is as bad as being frozen.

By Mr. Smith (Wentworth):

Q. The one is as bad as the other.

A. I think a good deal of this injury to fruit in transit, both from frost and from overheating, is the result of a lack of attention.

By Mr. Findlay:

Q. What is the proper temperature for the best preservation of apples?

A. From 30 to 34 degrees. Of course you cannot regulate the temperature so closely as to keep it as low as 30 degrees all the time. That is the minimum.

By the Chairman:

Q. I think the government should do something. I have representations from fruit dealers in my section of the country, stating that they have lost seriously this year, and if the government can devise some way of inspecting these cars in transit it would be a good thing. I do not see any other way of regulating the temperature. This practice of leaving the matter to chance is never going to work successfully.

By Mr. Wright (Renfrew):

Q. Why could not these cars be heated with steam, just the same as the passenger cars?

A. I think that is a matter that would involve great difficulties on account of cars being cut off and the train broken up so frequently.

By Mr. Smith (Wentworth):

Q. I suppose this is a matter, in reality, for the Railway Commission?

A. I think so.

Q. Before you leave that subject of inspection under the Fruit Marks Act, I suppose that all fruit is subject to inspection. We have a very serious complaint in the tender fruit section that we have no inspectors there. An inspector at the point of shipment is of very much more value than one at the point of destination. In fact you cannot have an inspector at all points of destination, at all the different towns, but one or two inspectors at the shipping points would be of very great value.

A. I will make a note of that and see what can be done.

EXTENSION OF MARKETS.

Another line of work which bears on the same question, which we call 'the Extension of Markets Division,' has to do with the inspection of perishable cargoes, both at Montreal, as loaded on the steamers, and as discharged from them at ports in Great Britain. We have five men employed in Great Britain and six men at Montreal, mak-

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ing reports of every steamer that sails from or arrives at the ports, and during the winter months the men are transferred from Montreal to St. John and Halifax.

By Mr. Wilson (Lennox):

Q. Have you an inspector at Portland?

A. No.

Q. Would it not be a good thing to have one there?

A. We have never thought it necessary.

Q. That is where those changes were made, was it not?

A. Yes, but that is a matter of the Fruit Marks Act—another class of inspection altogether.

Q. Would not your inspector have stopped it, had there been one at Portland?

A. Well, it has been stopped; it was stopped right at the beginning; there were only two carloads that were changed.

This (producing file) constitutes the report from one ship for one sailing. I have brought this matter before the committee to show you the kind of information we get, both from Great Britain and Montreal, in regard to the condition of each cargo.

By Mr. Maclaren:

Q. Where does that cargo come from, and what ship?

A. This is the report of the cargo of the steamship *Devout*, of the Thomson Line, that sailed from Montreal on October 13, which arrived in London on October 26. It gives full information as to the character of the cargo, the temperature in the cold storage chambers (10 degrees), and other information of that kind.

Q. Do you find people paying the same attention to perishable goods arriving at London and other points, or do they pay more attention to them than they used to?

A. We find that they are paying more attention.

Q. What has brought about the change in the condition of goods when they arrive there?

A. I think the representations made by officers of the department and others have had some effect, and I think that the great improvement in the facilities at the Surrey Commercial docks at London has had the effect of toning up the service at other points. It will be news to the committee, because it is news to everyone in the country that there is to be a very decided improvement at Liverpool during the coming season.

By Mr. Sproule:

Q. There are better facilities at Manchester than at Liverpool, are there not?

A. Yes, but the trouble is that there is rather poor steamship service to Manchester. There are only three steamers in the Manchester service having cold storage, and their capacity is small.

By Mr. Maclaren:

Q. There have been great improvements in the facilities at Avonmouth?

A. Yes, and there have always been large shipments to Avonmouth, which is the port of Bristol.

Q. They have been making very great improvements there?

A. Yes, they are constructing a new dock which, it is said, is to be one of the finest docks in Great Britain.

Q. And great efforts are being made to divert shipments to that port, I believe?

A. Yes.

IMPROVED FACILITIES AT LIVERPOOL.

I want to refer to the facilities at Liverpool. I have in my hand an extract from a letter from the Allan Line in which they tell me that they have completed arrangements with certain cold storage warehouses there so that they can issue bills of lading, with

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certain provisions attached, which will include all charges for dock and town dues, master portorage, cartage to the cold store, receipt, storage for one week and delivery thence to consignee's order within a two-mile radius. The rates are given for the service, which is practically the same as in London, except that it involves the question of cartage which is objectionable.

I have also a copy of the *Liverpool Courier* of February 8, in which they refer to a meeting of the Dock Board, and an agreement which has been reached between the C.P.R. Atlantic Steamship Line and the Dock Board, allowing the steamship line a certain berth and giving the company the privileges of erecting their own cold storage in the dock shed. I communicated with Mr. G. M. Bosworth yesterday about the matter, and he said they were hardly decided on the question yet, but he cabled over, after getting my letter, to their representative in Liverpool, who replied that he was making a canvass of the trade in Liverpool in order to ascertain whether they would be justified in putting in the cold storage. I think when they complete their canvass they will put it in.

By Mr. Lewis:

Q. To whom do the existing plants belong?

A. There are none on the quays at Liverpool now, but there are several private warehouses in different parts of the city.

Q. Are there cold storage plants at other ports in Great Britain?

A. There are many cold storage warehouses in Great Britain, but not at the dock as a rule. There are two cold storage warehouses at the Surrey Commercial docks, London.

Q. By whom are they owned?

A. They are owned by the Dock Company. The dock is owned by a private company. There is that difference between Liverpool and London. The docks at London belong to private corporations, but in Liverpool everything connected with the Mersey is controlled by the Mersey Docks and Harbour Board.

By Mr. Schell (Oxford):

Q. Have you the rates that the Allans offer for the delivery of these goods and keeping them in cold storage?

A. The rates are: For cheese, mild cured bacon and fruit—keeping in cool air during the warm weather at a temperature of about 50 to 55 degrees, the charge is 8s. 6d. per ton of 2,240 lb. That includes dock and town dues, master portorage, cartage to the cold store, receipt, storage for one week and delivery thence to consignee's order within a two-mile radius of the Canada Dock Cold Store (which includes the principal Goods Railway Stations), or to Victoria St. or the Liverpool Abattoir (where chilled beef is sold).

Q. That is a very moderate rate.

A. Bacon and sides of beef (chilled); kept at a temperature of about forty degrees, 10s. 7d. Butter, frozen poultry, meats and fish; kept at a temperature of about fifteen degrees, 15s.

By Mr. Lewis:

Q. How do the facilities at Liverpool compare with those at London?

A. Oh, there is no comparison, you might say.

Q. Which is preferable?

A. At the Surrey Commercial Dock, London, the facilities are ahead of anything anywhere else in the old country at the present time.

By Mr. Maclaren:

Q. But that is only one dock in London?

A. Nearly all the produce now goes to that one dock.

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By Mr. Lennox:

Q. What about Manchester?

A. There are very good facilities at Manchester, but the cold storage service on the steamships sailing from Montreal to Manchester is not regular enough, nor is there sufficient refrigerated space.

By Mr. Maclaren:

Q. It will pay the shippers of Canada to pay that extra charge rather than have the loss of one cent a pound on cheese and butter that we have sometimes had to face.

A. I think it will.

By Mr. Smith (Wentworth):

Q. In that letter of the Allans they speak of keeping fruit at a temperature of between 50 and 55 degrees, that classes apples along with cheese, but that would not be suitable for tender fruits.

A. There seems to be no provision for that.

Q. They provide a freezing temperature for poultry?

A. Yes, but that is too low for fruit.

Q. They might also provide a suitable temperature for tender fruits, I think. Before you leave that subject, you have a report of every steamship, covering every cold storage shipment that goes over, from the different agents on this side as well as on the other side; what do you do about that when you get the report back here?

A. If there is anything unusual about it, we call the attention of shippers to any question of fact.

Q. Supposing the temperatures are not what they ought to be?

A. All the records of temperature are posted at the Board of Trade, Montreal, and we have offered at all times to send a copy to any shipper who is interested in any shipment on any particular vessel.

By Mr. Maclaren:

Q. Have you any records showing the temperature of the apples on reaching the steamship, and on leaving the ship?

A. We have some information on that point, but if you will allow me to proceed I will come to that in a minute.

By Mr. Smith (Wentworth):

Q. Speaking further on that point, when you get a bad report of a cold storage temperature, what do you do with the steamship company?

A. We call their attention to it.

Q. That is all you can do?

A. The fact that it is published, is, of course, a penalty, because now the shippers are watching these reports.

Q. You could make a regulation that the steamship should carry these different products at certain temperatures to suit the different articles?

A. I think that would be a rather difficult thing to decide. I do not see very well how a regulation could be made to fix a certain temperature to be maintained in each case. Very often it happens that there is not a sufficient quantity of a certain commodity awaiting shipment, and two different commodities have to be put together in the same chamber, the shippers of both commodities agreeing, rather than miss the steamer, to mix the commodities.

Q. It will depend on what the commodities are; you could not put fruit with butter?

A. It has been done, and shippers prefer to ship that way rather than wait.

Q. Are they consulted about that, do you think?

A. Yes, I think the steamship company would never put fruit in with butter without the shippers knowing all about it.

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INSPECTION OF ICED CAR SERVICES.

Now, there is just a word or two that might be said in regard to the inspection of this iced car service. These inspectors co-operate with the fruit inspectors in work of that kind a good deal. We had last year, for the first time, an inspector over the routes on which the iced butter car ran in Western Ontario, and we found it made a considerable difference in the service, we got rather better satisfaction from that service than ever before. The cars were better iced. The great complaint of the present time with regard to the butter service is irregularity in the running of the car. We cannot control that, we cannot regulate the railway; we can only point out when the cars are delayed; but it is a great drawback to the butter shipper who brings his butter to the station at schedule time and finds that he has to leave it there for hours, waiting for the train to come along and pick it up. That is a very great drawback, and it is to be hoped that the railway companies will be able to improve that.

By Mr. Maclaren:

Q. The trouble is that sometimes when the train does come it hasn't any iced car at all.

A. There is always a car on the routes that are arranged for. We have a regular schedule of routes on which cars run weekly, or in some few cases fortnightly, over the line. I would like, before I leave this division of my work, to refer to the work of Mr. Moore, my assistant, who has special charge of the details of the inspection. In that connection his work has been very helpful indeed, and those of you who know anything of him know that he has done most excellent service in that respect.

COLD STORAGE.

Now I come to the question of cold storage, and I want to refer briefly to the different channels through which the department assists in procuring cold storage for perishable produce, but I intend to confine the most of my remarks to the newer phases of cold storage.

By Mr. Wright (Renfrew):

Q. Will you be able to tell us what the government is doing in New Zealand?

A. The government of New Zealand does nothing in the way of providing cold storage, and never did, although there appears to be a misconception in the minds of many on that point.

By Mr. Schell (Oxford):

Q. The New Zealand service has been frequently referred to in comparison with ours, as if they were doing more than we are?

A. They never did anything to provide for cold storage, except in this way: in connection with the grading of butter and cheese they had to provide warehouses in which to store these goods after they are graded. The government assumes full control after they are once graded, and they had, therefore, to have cold storage warehouses for that purpose. But the government did not provide the cold storage, they simply paid towards the charge for the storage. It was not of any particular advantage to the creameries, because they have their own mechanical refrigeration, but the government, taking control of the goods, were obliged to provide the cold storage.

By Mr. Smith (Wentworth):

Q. These are usually located at the shipping points?

A. Not always, some of the grading stations are not at shipping points.

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By Mr. Schell (Oxford):

Q. But the New Zealand government has never taken control of the transportation by steamship in cold storage?

A. The government has never had anything to do with it. I will refer to the New Zealand service later on when we come to discuss another phase of the subject.

CREAMERY COLD STORAGE BONUS.

It is proposed to continue the payment of the \$100 bonus for the erection of a suitable cold storage at creameries. This work, which costs a few thousand dollars a year, amounting to about \$2,500 last year, has had the effect of improving very much the character of the cold storage at creameries throughout the country. It is a difficult thing to convince the average creamery owner of the importance of keeping butter at an average low temperature, and we have in this way directed attention to the improvement, then there is the iced butter car service which was in operation last year from May 27 to October 1.

By Mr. Smith (Wentworth):

Q. Are there many creameries that have not cold storage?

A. Not very many but have some kind of cold storage.

By Mr. Schell (Oxford):

Q. The government is giving a grant of \$100 a year, is that it?

A. To creameries that put up cold storage on our plans and specifications the government gives a bonus of \$100.

Q. For how long?

A. For one year for each creamery.

By Mr. Maclaren:

Q. There were a number of creameries that built cold storage chambers last year and got the money, were there not?

A. There were 25. Taking it from the beginning, a total of 619 creameries have received the first instalment, but some of them did not receive the second or third instalments because they did not live up to the terms under which the grants were made.

Q. What do you mean by instalments?

A. Up to last year it was paid in three instalments; \$50 the first year, and \$25 in each of the next two years, providing the proprietor maintained the cold storage according to the conditions of the grant. Some of them did not, and they did not receive the second and third instalment.

Q. And now you pay the \$100 right out?

A. Yes, we made our plans and specifications a little harder to live up to, and we encourage them by giving them the \$100 at the end of the first season, thinking that method would go a little farther in the way of making it effective.

By Mr. Maclaren:

Q. Do you send an inspector out to see that they are properly erected?

A. We do.

ICED BUTTER CAR SERVICES.

The iced butter cars ran over 57 different routes to Montreal last season. The government guarantees two-thirds of the earnings on a minimum car, plus \$4 per car for icing.

ICED CHEESE CARS.

Then iced cheese cars were provided, that is to say, the government arranged with the railway companies to pay \$5 per car for icing of cheese cars to be supplied on the demand of the shippers for shipments of cheese in car lots from July 1 to September 9, allotting a certain number to each railway (altogether 110 cars per week). I find from the records received that 1,161 of these cars were supplied.

ICED FRUIT CARS.

Then there was another service, the iced fruit cars; that was a new service last year which was provided on the same terms as the cars for the shipment of cheese from August 1 to September 30.

Q. What territory would that cover?

A. Anywhere for shipment of fruit to Montreal and Quebec.

Br. Mr. Ross (Yale-Cariboo):

Q. From British Columbia?

A. If they wanted them, but the government only agreed to pay \$5 per car for the icing. About 130 cars were supplied for this service.

By Mr. Schell (Oxford):

Q. Ten dollars would ice a car fairly well from British Columbia to Montreal?

A. It would depend largely on how long they took to come.

COLD STORAGE ON STEAMSHIPS.

Just a word or two about cold storage on steamships. I have here a revised list of the cold storage steamers sailing from Montreal, with the capacity in cubic feet of the cold storage accommodation on each ship, which I would like to give for the information of shippers.

The following is a complete list of the steamships sailing from Montreal and Quebec in 1906 having cold storage:—

Allan Line.

Name of Steamer.	Number of Chambers.	Capacity in Cubic Feet.
To Liverpool—		
Tunisian..	4	21,650
Victorian..	4	14,080
Virginian..	4	12,440
Ionian..	4	13,653
*Parisian..	1	4,288
To London—		
Hibernian..	4	8,166
Hungarian..	4	7,994
Ontarian..	4	16,843
Pomeranian..	2	8,130
Sardinian..	2	10,228
Sarmatian..	2	10,032
To Glasgow—		
Corinthian..	2	16,722
Sicilian..	3	17,980
Pretorian..	3	25,270
Mongolian..	2	8,101
Numidian..	2	8,101

*This steamer took only one cargo out this season.

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Canadian Pacific Line.

Name of Steamer.	Number of Chambers.	Capacity in Cubic feet.
To Liverpool—		
Lake Erie..	4	24,000
Empress of Britain (from Quebec).. . . .	3	29,700
Empress of Ireland (from Quebec).. . . .	3	29,700
To London—		
Montrose..	4	28,154
To Bristol—		
Montcalm..	1	15,340
Monmouth..	2	17,000
Montfort..	3	24,700

Dominion Line.

To Liverpool—		
Dominion..	4	40,985
Canada..	4	47,915
Kensington..	1	26,567
Southwark..	1	26,029
Ottawa..	2	27,410
To Bristol—		
Manxman..	3	51,033
Turcoman..	4	33,029
Englishman..	4	32,262

Donaldson Line.

To Glasgow—		
Marina..	4	11,719
Parthenia..	4	16,000
Athenia..	4	16,122
Lakonia..	4	14,526
Kastalia..	4	13,498
Cassandra..	3	7,770

Manchester Line.

To Manchester—		
Manchester Commerce..	2	10,000
Manchester Trader..	2	5,000

Thomson Line.

To London—		
Cervona..	4	14,321
Devona..	3	21,953
Hurona..	4	20,487
Iona..	4	18,472
Kildona..	3	14,570
Latona..	3	45,682

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Combined cold storage space of above-mentioned steamships sailing to the various ports in 1906:—

	No. of Sailings.	Cubic Feet.
Bristol.. . . .	31	899,849
Glasgow.. . . .	61	872,025
London.. . . .	63	1,116,683
Liverpool.. . . .	75	1,921,537
Manchester.. . . .	10	75,000
Totals.. . . .	240	4,885,094

COOLED AIR SERVICE, 1906.

The following steamships with cooled air service sailed from the port of Montreal during the season of 1906:—

	Cubic Feet Space.
Allan Line—	
Potomacian.. . . .	26,000
Hungarian.. . . .	45,000
Hibernian.. . . .	45,000
Ontarian.. . . .	19,000
Sardinian.. . . .	17,600
Canadian Pacific Line—	
Montcalm.. . . .	18,688
Monmouth.. . . .	18,500
Dominion Line—	
Southwark.. . . .	41,472
Canada.. . . .	46,904
Kensington.. . . .	42,116
Thomson Line—	
Iona.. . . .	80,173
Ceryona.. . . .	97,530
Kildona.. . . .	79,389
Hurona.. . . .	79,707
Devona.. . . .	97,574
Latona.. . . .	50,086

There were 82 sailings of these steamers, making the total available space for the season, 4,119,304 cubic feet distributed as follows:—

	Cubic Feet.
To Bristol.. . . .	185,940
To Liverpool.. . . .	782,952
To London.. . . .	3,150,412
Total.. . . .	4,119,304

SERVICE REPORTED SATISFACTORY.

I made inquiries some time ago of the president of the Montreal Produce Merchants Association as to the character of the service on the steamships during the past season, and in his letter of reply he says: 'Taking the whole system through, the refrigeration now is very satisfactory and a great improvement on previous years.'

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THERMOGRAPHS.

You have all heard about the thermographs that are used on the steamers, and I would only say that last year we got twice as many records as we ever did in any previous year. Altogether we received 488 records, and reports have been made to shippers whenever required. Tests are also made of the actual temperature of butter and cheese as delivered on the other side, which is really the best test of the temperature at which the goods are carried. I find that the ocean refrigeration seems to be the most effective of any in the whole chain, because we find that the temperature, the average temperature, at which butter is carried in these ocean refrigerators, is reduced as much as 21 degrees from the time it is put in the chamber until it reaches the other side.

By Mr. Smith (Wentworth):

Q. You speak about the ocean refrigeration being the best in the chain, there is no other refrigeration in sight?

A. I am referring to the iced cars.⁴

Q. You can't call them cold storage?

A. We do not call it cold storage, of course, but it is a refrigerated service, the same as cold storage at the creameries. There is cold storage at Montreal, but it is not used as effectively as it should be or the butter would not be reduced in temperature so much on board ship.

By Mr. Maclaren:

Q. But if the butter is twice chilled and twice heated, in what condition will it be when it reaches the consumer?

A. It will depend upon the variations in the temperature.

By Mr. Smith (Wentworth):

Q. You will notice by the reports that the temperature of some of the butter was five degrees lower when taken out on the other side, and inspected by your inspector there, than the temperature of the chambers at any time during the journey?

A. I think that is explainable in this way. That that particular package of butter had either rested against the circulation opening or near the cold pipes. You know there is always a difference in the temperature at different parts of the chamber.

By Mr. Schell (Oxford):

Q. If the butter is placed exactly opposite the opening, or draft, there will be a difference of five or ten degrees.

By Mr. Maclaren:

Q. I do not think you will find a difference of more than one degree.

A. There must be a difference between the temperature in the different parts of the chamber, that is the reason why we require a constant circulation.

By Mr. Smith (Wentworth):

Q. Yes, but butter that has been eight or ten days on the ship and brought down ten or fifteen degrees, would not have sufficient heat in it to raise the temperature four or five degrees in one part of the chamber higher than in another. What would make heat in one part of the chamber more than in another?

A. It is not a question of making heat, but that one particular part of the chamber is colder than another.

Q. But all parts of the chamber should be at the same temperature?

A. That is not always the case, that is one of the difficulties, there is no provision for rapid circulation with the brine system. Where the chambers are very full there is no forced circulation, it is only by gravitation.

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I now come to that part of our cold storage talk which may have some special interest, owing to legislation which is now before Parliament. I find that there is a great demand for information about cold storage and especially about mechanical refrigeration at the present time; I am getting a great deal of correspondence, and I know that a great many people come to me for information on this line.

ARTIFICIAL REFRIGERATION.

I want to say something about artificial refrigeration. I believe it will be worth while to give a little attention to that phase of the subject. The different systems of artificial refrigeration may be divided into three classes; in the first place there is the purely chemical refrigeration with frigorific mixtures, which includes all mixtures like ice and salt and various other chemicals. There is a long list of chemicals which may be used, but ice and salt is the only practical one on account of the comparatively low cost of the salt. Now, I do not, by any means, speak of this kind of refrigeration as obsolete, there are many uses yet for small storages with ice and salt as a refrigerant, or even ice alone where no extreme low temperatures are required, and where the place to be refrigerated is small. I believe there is good use yet for that kind of refrigeration.

By Mr. Sproule:

Q. Would it not be useful for the ocean service?

A. I do not think it would be practicable for ocean refrigeration, because the carrying of a large quantity of ice across the ocean would be objectionable on account of the amount of storage that is required for it; mechanical refrigeration for that service is a long way ahead of the ice. I am thinking more of the country grocer, who handles a large quantity of dairy butter, butchers and others requiring small refrigerator spaces. We know of the great waste that takes place and that this waste would be, in some measure, prevented if a small chamber were provided in which a few hundred packages of butter could be stored. Butter can be kept in that kind of storage for a week or so. It depends a great deal on how cheaply you can get ice, and how cheaply you can get salt; of course there are some places where salt costs a great deal because of the distance from the source of supply.

By Mr. Smith (Wentworth):

Q. I might say that I have a number of cold storage rooms, about the size of this room, and they are served with ice and salt; I can put the temperature down to 30 degrees, just where I want it, and can hold it exactly for weeks and months at 33, or wherever I want it, without varying more than one degree in any part of the room.

A. You do not have much circulation.

Q. I have an excellent circulation, by gravity; I use the ice and salt. It is the bunker system.

A. You can produce a temperature five degrees below zero in a mixture of ice and salt, about two parts of ice to one of salt. That is the minimum in the mixture itself. It is possible to keep a room below freezing with this mixture.

THE ABSORPTION SYSTEM.

There is another system of artificial refrigeration which is known as the absorption system, and it is a sort of semi-chemical system with retorts and cylinders which are charged with an aqueous solution of ammonia, the vapours of which are driven off by the application of steam heat, and refrigeration is brought about by the cooling, condensing and expansion of the ammonia. Some engineers still struggle with that system and think it is the most rational system of all, but so far it is not used much.

COMPRESSION SYSTEM.

The third is the compression system, and it is the true mechanical system and the most popular in all respects. Now, I would like to explain as briefly as I can, how

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refrigeration is brought about on the compression system. The machine for producing mechanical refrigeration on the compression system consists of three parts: 1, a compression side; 2, a condensing side; 3, an expansion side.

I cannot explain the compressor any better than by saying that it is like the steam engine reversed. The steam engine is a machine for converting heat into work, and the compressor is a machine for converting work into heat. In this machine a volatile gas is used which under compression gives off a certain amount of heat. That is the first part of the machine, and from it the gas passes to the condenser part which is a series of coils over which cold water is constantly flowing, the cooling in addition to the compression effecting the liquification of the gas. The liquified gas is now allowed to pass from the condenser into the expansion coil, where the pressure is lower and where it expands again to the gaseous form and must take up heat in doing so. It takes up exactly the amount of heat which was carried off by the water passing over the coils of the condenser. The simple compression and expansion of a gas will not produce refrigeration. A good many different gases have been used as refrigerants. Some of the earliest cold storage machines used ordinary air as a refrigerating medium, and it is yet used on shipboard a good deal on account of its safety. It is not considered economical because a large volume of air has to be used, necessitating large movable parts, and therefore, excessive friction in the operation of the machine. There are two ways of using air, the closed cycle and the open cycle of operation. In the open cycle the air is pumped from outside and allowed to discharge into the room where the refrigeration takes place; as the name implies in the closed cycle, the same air is used over and over again. One objection to air is that it is a permanent gas at refrigerating pressures and temperatures and, therefore, its latent heat is not available.

Ether was one of the first gases used for this purpose; sulphur dioxide is still used; carbon dioxide is used quite extensively, especially for marine work, for the reason that it does not attack copper or any of its alloys, and therefore, brass journals can be used in the parts of machinery exposed to it.

By Mr. Schell (Oxford):

Q. How much water would it require at a temperature of about fifty degrees?

A. With water at fifty degrees you would probably get along with three-quarters of a gallon per ton of refrigeration per minute; the usual rule is one gallon per minute.

AMMONIA MACHINES.

Anhydrous ammonia, that is ammonia free from water, is the gas most commonly used for land refrigeration, and it is also now used for marine refrigeration to some extent, because the machinery has been more perfected recently. There have been some serious accidents on board ships with the ammonia machines. Some part of the machine burst on a New Zealand mutton boat some years ago and the ammonia fumes filled the engine-room so quickly that the engineers were driven out, and it took a long time before they could get rid of the fumes and return to the engine-room. There was a very serious accident in one of the Armour plants at Chicago the other day; an explosion took place and some men were killed by the ammonia. But they have improved these machines, and by locating them on the upper decks there is less danger from accidents. The ammonia machine has this advantage that low pressures are used as compared with some of the other gases. On the compression side of an ammonia machine a pressure of about 175 lb. to the square inch is all that is necessary, but with a carbon dioxide machine it runs up as high as 900 lb. to the square inch, where the temperature of the water is a little high. ,

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USING THE REFRIGERATION.

There are different ways of applying the refrigeration to the warehouse. In the first place there is what is known as the direct expansion. The expansion parts of the

machine consists of pipe coils, like steam coils, usually placed along the walls of the room to be chilled.

Another plan is to place the expansion coils in a tank filled with brine and the tank is placed in the room where it is required; that is useful where intermediate refrigeration is desirable, as there is a certain amount of reserve in the brine, which keeps the room cold for a time after the machine ceases work.

In the brine circulation system the expansion coils are located in large brine tanks, and the brine is forced through coils of pipe into the room where the refrigeration is needed.

By Mr. Wright (Renfrew):

Q. Are these pipes the ordinary iron pipes?

A. Yes.

Q. What sizes are used?

A. Different sizes, according to the capacity of the machine. The galvanized-iron pipe is not used to contain ammonia, because the ammonia attacks the zinc, and forms a permanent gas, which would cause serious trouble.

THE AIR COOLER SYSTEM.

Then the system which is most generally used in Canada is known as the air cooler system. Under this system the expansion coils are put in what is called a bunker, that is, a chamber which is just big enough to hold these expansion pipes. The pipes are placed over a tank which contains brine made with common salt, or chloride of calcium for low temperatures. A system of ducts or trunks is arranged through which the air from the storage rooms is drawn by means of fans, passed over the cold pipes where it is chilled and returned to the rooms. This system has given good satisfaction in Canada and is one which is used a great deal. It has this advantage that the circulation of air which is provided carries off certain impurities that arise from the goods in storage, and which are absorbed in the brine as the air passes over these coils. Further, the brine absorbs the moisture from the air as it passes, giving a dry storage which is a great advantage in storing certain classes of goods. The system has not been so satisfactory on board ship, because the marine men complain of the amount of space taken up by the air trunks, which is objectionable.

By Mr. Smith (Wentworth):

Q. Did you ever investigate the Wagner system under which the ammonia passes through a small pipe inclosed in a larger pipe?

A. I have heard of the Wagner condenser, but I do not know anything about its operation.

HISTORICAL.

Just a word or two about the history of the use of mechanical refrigeration. Mechanical refrigeration became practical in the sixties. Before that there had been a number of machines made of various kinds, but none of them proved to be of very great practical use. There was an attempt made to ship frozen meat from Melbourne in 1873, but it was a failure. The first successful shipment of frozen meat from Australia was by the steamship *Strathleven*, in either 1879 or 1880, I am not able to determine which year. Then a shipment of mutton from New Zealand took place the following year in the old sailing ship the *Dunedin*. Meat was shipped from the United States to Great Britain in 1875 or 1876; this seems to have been about the first use to which mechanical refrigeration was put. Of course we had cold storage with ice long before that.

FIRST PLANT IN CANADA.

As near as I have been able to ascertain, the first mechanical plant was established in Canada in 1892. That was the first application of mechanical cold storage in this country.

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COLD STORAGE FOR FISH.

The application of cold storage in the fish trade would, I believe, result in a great expansion of that trade. I do not think that it has been fully realized yet what might be done in this direction. They are doing more in this way for the fish trade in Great Britain than we are. I find that many of the steam trawlers in Great Britain have mechanical refrigeration, and it may be of interest to the committee to know that in some of these trawlers they have brine tanks which are kept at a temperature of 15 or 16 degrees, into which they dump their fish just as they are taken out of the water, and where they are at once frozen solid. That keeps the fish in prime condition, and those of you who have been in the old country know that is where you get fish in prime condition.

COLD STORAGE FOR FURS AND WOOLLENS.

There is also room for expansion of the cold storage in connection with the storage of furs and woollens. Some of the cold storage warehouses in the United States are used largely for storage of furs, which is the cheapest and the safest way of protecting them from moths. The Lincoln Deposit Company, of New York, a company doing a very large business, receive as much as \$30,000 worth of furs into cold storage from one customer.

COLD STORAGE FOR APPLES.

I wish briefly to refer to the apple trade, and the way in which cold storage may be of benefit to that trade. We hear a great deal at times about the tremendous waste that occurs in the apple orchards throughout the country every year that there is a big crop. The actual waste has been very much exaggerated. People drive about the country, pass an orchard and see a large number of apples lying on the ground, and they speak about the waste. Most of those apples, however, are worthless anyway. I believe that a great deal of this talk about waste results from a misconception on that point. The great use for cold storage is in improving the condition of the marketable apples. Apples can be allowed to mature better on the tree, and these apples will keep better afterwards, if preserved at a proper temperature, than those which are picked green. They are not so liable to scald, which is one of the great difficulties with some varieties. They would become, when better preserved, a more stable commodity, and those who deal in apples will not require so large a margin, because the liability to loss will be much reduced. As it is now the dealers must count on possible loss, but if the condition of the fruit could be more perfectly controlled so that they could be sure of having a sound, marketable apple, they would, I think, be ready to do business on a smaller though safer margin than they do to-day, because of the big element of risk which would be removed. It is along these lines that great benefit to the trade will result. Apples will be of a more stable character and more certain of being in a good condition, so that our trade will experience a great expansion.

By Mr. Smith (Wentworth):

Q. What is your experience with regard to apples taken out of cold storage on the ship and put in a higher temperature, will they not deteriorate more in the same length of time than if they had not been in cold storage?

A. When placed in the lower temperature the ripening of the apple is simply checked. The life processes in the apple are checked and it delays the time when the apple will become decayed or over-ripe. If you place an apple in cold storage you check this ripening process, it does not stop it altogether, no storage stops these changes entirely, they go on, but more slowly and more slowly as the temperature is reduced. But if the apples are kept in cold storage for a length of time this process goes on until the apples come pretty near the end of their life history, and when such apples are taken out they go down rapidly; but these same apples would have gone down much more rapidly if they had not been in cold storage. Their life would have been that much shorter.

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Q. The point I want to make is this: if you put them in cold storage they should be kept there until you wish to sell them; it is necessary to carry them in cold storage to the journey's end?

A. Well, I think the apple which has been kept in cold storage is naturally riper than the apple which has been shipped before putting in cold storage.

Q. What will be the effect upon the apple shipped afterwards, after it has been taken out of cold storage and sent to the old country?

A. That will depend upon the condition of the apple when it is shipped. It all depends upon the stage of ripeness to which the apple has attained.

By Mr. Schell (Oxford):

Q. What I meant was with reference to apples put in cold storage for two or three days or a week?

A. I do not think it will make any difference. Those apples when taken out of cold storage should be protected from collecting moisture.

Q. If they are put into a warmer temperature they are bound to take moisture?

A. If they are kept in closed packages they will not collect very much; the apples do not sweat, it is the moisture from the warm air condensing on the cold surface of the apple that causes dampness. If you could keep the warm air from coming into contact with the apple it would not be affected.

Q. There will be air, of course, in the barrel?

A. There will be some air, but it does not amount to much; you do not notice this moisture until you open the barrel, that is when the condensation takes place. I think if the packages are kept closed there is not much danger. The practice has been adopted in some warehouses of bringing goods out of cold storage into an outer room where the temperature is higher, and covering them with a blanket, leaving them in that condition over-night and allowing them to become gradually warmed up.

There is another point, of course, in which the cold storage will be of benefit to the apple trade, and it is that apples can be held in times of large crop, until the period of glut in the markets has passed. At the present time there is a very large amount of apples in store in New York state, and they have quite revolutionized their trade in the 'Greening' by being able to store their apples for two or three months. It is estimated that there are about 5,000,000 barrels of aples going into cold storage every year in different parts of the United States.

WAREHOUSE EQUIPMENT.

Now, I have some notes in regard to the equipment of a cold storage warehouse. I am often asked questions as to the relation between refrigeration and the space to be refrigerated. The following figures come pretty near answering those questions in a general way. Of course one must know exactly the character of the building, the kind of goods to be stored, and the temperature which will be required, before being able to give exact information on a point of this kind. I would say that the following is an approximate estimate:—

APPROXIMATE RELATION BETWEEN SPACE TO BE REFRIGERATED AND TONS REFRIGERATION REQUIRED.

Space.	Refrigeration Required.
1,000 cubic feet.	10 tons per day.
30,000 "	20 "
50,000 "	30 "
75,000 "	40 "
100,000 "	50 "

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POWER REQUIRED.

For each ton of refrigeration about $1\frac{1}{2}$ horse-power should be provided. That will be sufficient for pumping water and brine and driving fans, in addition to running compressor.

WATER FOR COOLING PURPOSES.

The water supply is a very important consideration in planning a refrigeration plant, as the amount of refrigeration performed is only equal to the heat taken up by the cooling water which passes over the condenser coils. It requires, roughly speaking, about 1 gallon of water per minute per ton of refrigeration; that is to say, a 10-ton machine would require 10 gallons of water per minute—more or less according to the temperature of the water.

You get no refrigeration whatever except the cooling that is effected by the water which passes over the condensers. We speak of tons of refrigeration. That is equivalent to the melting of one ton of ice, the standard for a ton of refrigeration. In other words it means the removal of 284,000 heat units from the warehouse or from the goods that are in store. Now, a heat unit is the amount of heat which is required to raise one pound of water from a temperature of 39 degrees to 40 degrees Fahr. That is the British thermal unit, B.T.U. is the way you see it expressed in refrigeration literature. One pound of ice in melting absorbs 142 heat units without increase of sensible heat or rise in temperature. Therefore, $142 \times 2,000 = 284,000$. That is what is meant then by a ton of refrigeration; the melting of one ton of ice. If you have a supply of cooling water at a temperature of 50 you may count on raising the temperature of that water 30 degrees, so that every pound of water is equal to 30 heat units. You can, therefore, easily calculate how much water will be required to effect a ton of refrigeration. The water supply is a very important consideration in planning a refrigeration plant, much more so than most people seem to imagine. It is so important that many large plants have provided an artesian supply.

By Mr. Schell (Oxford):

Q. What is the temperature of the water usually pumped?

A. It all depends upon the source. Take water in a city like Ottawa and I think it is about 65. The water from a deep well will be somewhere in the neighbourhood of 50.

By Mr. Smith (Wentworth):

Q. The water is only used once?

A. The water can be cooled and used a second time. That is sometimes done. In running a plant some years ago I had difficulty in getting a supply of water and ran the water back into the well. Of course it got dirty, but that did not interfere with its cooling power, and the plan seemed to work all right. Tapping the city water mains is rather an expensive business in connection with cold storage, and if any of you think of going into the business, I would advise you to get a flat rate from the corporation before they find out how much water you are going to use.

By Mr. Sproule:

Q. It did not seem to raise the temperature of the well very much running the water back again?

A. I did not take any note of that, as we had plenty of water for our purpose.

COST OF WAREHOUSES.

Now then, as to cost. I find it pretty difficult to give reliable and accurate information upon that point. But for a medium sized non-fire proof warehouse, say 50 to 100,000 cubic feet, I think you can equip it, exclusive of site and water supply, for about 25 cents per gross cubic foot of capacity. That provides for the rooms for machinery and offices, as well as the refrigerated space.

By Mr. Thompson:

Q. What is that in dollars and cents?

A. Twenty-five cents per gross cubic foot of capacity.

Q. You say 50,000 to 100,000 cubic feet?

A. That would be \$25,000 for 100,000 cubic feet.

By Mr. Smith (Wentworth):

Q. That is very cheap?

A. It has been done for less than that, but I am making considerable allowance for increase in the cost of material since that time.

Q. I do not see how you can insulate for that?

A. Mr. Graham, of Belleville, tells me he put up a 20,000 barrel warehouse for \$30,000. I do not know exactly the size of that warehouse, but that is at the rate of 18 cents per cubic foot. I am figuring at 8 cubic feet to the barrel on the actual space required for 20,000 barrels. Another warehouse has been erected in Montreal of an entirely different character, costing 44 cents per cubic foot. It is an absolutely fire-proof building and there is no wood in it at all.

Q. And cork?

A. Cork, brick, hollow tiles, asphalt, and materials of that sort.

I have only one other note, and that is in connection with cold storage temperatures. I beg to submit the following figures which may be considered safe storage temperatures for different commodities.

COLD STORAGE TEMPERATURES.

	Deg. Fah.
Apples (long storage).....	31-34
Apples (short storage).....	40-45
Pears.....	33-36
Peaches.....	32-40
Grapes.....	35-38
Butter (long storage).....	10
Butter (short storage).....	20-25
Cheese (cool cured).....	60
Cheese (ordinary cured).....	35-40
Eggs.....	40-45
Meats and dressed poultry (10 to 20 days).....	30
Meats and dressed poultry (long storage).....	10
Bacon and hams	40-45
Fish (frozen)	15-18
Fruit trees.....	30
Potatoes.....	36
Furs and woollens.....	25-30

By Mr. Smith (Wentworth):

Q. I do not quite understand those figures for cheese; what is the difference between the different kinds, why are they kept at different temperatures?

A. There is this difference, that cheese which has never been allowed to become heated and which has never been subjected to those fermentations which produce bad flavours, that is to say, has been cured at the proper temperature, does not require to be stored in as low a temperature as the ordinary cured cheese. Cheese which has been allowed to reach a temperature of 75 to 90 degrees for a few days while it is maturing develops certain fermentations which give rise to bad flavours, and unless you put that cheese afterwards in a very low temperature those bad flavours develop to such an extent that the cheese becomes almost worthless. On the other hand, cheese which were never allowed to become heated while maturing do not usually develop the fermentations which produce bad flavour.

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The temperature for eggs is from 40 to 45; there is some difference of opinion with regard to these temperatures, but most of the Canadian exporters, those who handle eggs in large quantities, keep them at about 40 to 45 degrees. Eggs can be kept at temperatures down as low as 30 or 32.

By Mr. Schell (Oxford):

Q. Do they not keep them at the lower temperature in the cold storage warehouses too?

A. Yes, there are two methods of preserving eggs; one is by pickling them, preserving them in large vats where they are kept at about 45 or 50 degrees. I have discussed that matter with a good many egg men who handle eggs largely, and my information is, although I have no experience in the case myself, 45 degrees is the ideal temperature, but for dry storage, in cases, a lower temperature is sometimes used.

Q. Many of the firms are discarding the pickling process and adopting the cold storage.

A. I must confess I do not know very much about eggs; it is something we have never touched at all.

By Mr. Smith (Wentworth):

Q. Have you made any experiments with tomatoes?

A. No.

Q. That is a most interesting thing; it is generally believed that the temperature in cold storage is too low for tomatoes; we can grow them to perfection, and there is a large market in the old country if we can only get them over there. The general impression is that we are not keeping them at the proper temperatures?

A. We are keeping them too low, perhaps.

Q. Yes, there might be a very large trade developed in the old country if we could only land them there in good condition; they are an easy thing to carry.

A. I think I have some information in regard to keeping tomatoes, but I haven't it at hand at present.

Q. Did you say 30 degrees for fruit trees?

A. Yes, that is the temperature recommended.

Q. I would not like to risk it.

A. If you are storing apple trees and undertook to maintain a temperature of 30 degrees you would probably have trouble, but the lower figure mentioned in each case must always be taken as the minimum that is allowed.

Unless the members have some further questions to ask, that is about all I have to say at the present time, but I am glad to be at the service of the committee at any time you may require me.

Having read over the preceding transcript of my evidence, I find it correct.

J. A. RUDDICK.

Dairy and Cold Storage Commissioner.

CANADIAN AGRICULTURAL SEEDS.

HOUSE OF COMMONS,

Committee Room 34,

FRIDAY, February 22, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 a.m., Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—We have present to-day to address the Committee, Mr. G. H. Clark, Seed Commissioner, and Dr. C. E. Saunders, Cerealist at the Central Experimental Farm. Mr. Clark will lead in the discussion.

Mr. CLARK.—Mr. Chairman and Gentlemen, I am to present some evidence this morning, and be examined, upon 'Some Phases of the Supply and Commerce of Canadian Agricultural Seeds.' Before I commence, let me remind you that the duties of my office as Seed Commissioner do not include the work of experimentation or research with farm crops. That work, together with the free distribution of seed grain and other seeds grown on the Experimental Farms, comes under the direction of the Experimental Farms Branch of the Department of Agriculture. I mention this because, in discussing the subject before me, I shall have occasion to refer to the supply of seeds of different kinds of crops, and questions may present themselves to you, as to the relative value of those crops. I am sure you will agree with me that it would be unwise on my part to offer evidence before this committee that naturally grows out of work that has been or is being done by officers of the Experimental Farms Branch who are to appear before you. The work of the Seed Branch may be said to commence where the work of the Experimental Farms Branch leaves off. It is largely educational in nature. We adopt from time to time whatever means seem advisable to encourage the production, selection and use of high-class seeds for all kinds of farm crops. In the Seed Control Act, Parliament has given us a limited control over the trade in certain of the agricultural seeds. It is also our duty to enforce that Act.

COMPARATIVE ACREAGE YIELD IN DIFFERENT PROVINCES.

There are more than 30,000,000 bushels of seed grain used annually in Canada. When we consider the yields obtained from those grain crops, although they are perhaps as high in Canada as in any other new country, we have to conclude that they are lower than they should be. In the province of British Columbia the average yield of oats in bushels per acre is $42\frac{1}{2}$; in the provinces of Alberta, Saskatchewan and Manitoba about 35; in Ontario, $32\frac{1}{2}$; in Quebec, 25; in New Brunswick and Nova Scotia, about $25\frac{3}{4}$, and in Prince Edward Island about $27\frac{3}{4}$. We know, as a matter of fact, that there are quite large areas of oats that yield over 50 bushels per acre, and it necessarily follows that much of the acreage sown to oats yields considerably lower than what I have stated. I do not purpose to discuss at length this morning the causes for these low yields. Perhaps the main cause is to be found in bad methods of farming. The quality of the seed oats that are sown is only one consideration;

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but that is a factor which is of greater importance and deserves more attention than is credited by the average grain grower.

By Mr. Blain:

Q. How did you get the information which you have just given?

A. I have taken the information from the returns obtained by the Census Commissioner. For the western provinces I took the reports of crop estimates made by the provinces.

Q. The crop estimate, not the actual yield?

A. Not the actual yield, the crop estimate, for Manitoba, Saskatchewan and Alberta.

Q. You have the census figures. Why not take them for the Northwest?

A. The census for 1901 was taken from a year when the yield of grain in those provinces was below normal. On that account I thought it was unfair to show the crop of oats there as yielding only 18 or 19 bushels per acre.

By Senator Perley:

Q. The crop of 1900 was a very poor one?

THE WEED PROBLEM.—WEED SEEDS IN THE SOIL.

I come now to a question of seed supply, which is perhaps aside from the supply that may be said to enter into legitimate commerce, but which is an exceedingly important factor in reducing the average yield of cereal grain and other crops throughout Canada. I refer to the supply of weed seeds in the soil. The expense for labour required to keep under control the noxious weeds that have become so prevalent throughout Canada is one of the serious problems with which our farmers have to contend. These weeds are practically all produced from seeds, and it is both interesting and alarming to know that in many of the weed-infested districts there is a sufficient supply of noxious weed seeds in the soil to produce luxuriant crops of their kind for the next ten or fifteen years.

THE WORK OF THE SEED LABORATORY.

You are aware that in our seed laboratory work we are exceedingly busy during the active season of the seed trade. During the summer months we have an opportunity to undertake special investigation work. I procured, last summer, samples of soil taken from weed-infested districts in the province of Manitoba. Those samples were taken by means of standard soil samplers. A tube about an inch and a half in diameter, forced into the soil to a depth of seven inches, provided us with samples for examination as to the weed seed content. Twenty-nine such samples were carefully analyzed in the seed laboratory and their content of weed seeds identified and tested as to vitality. To say the least, the results were much beyond our expectations, even for soils which were known to be foul with noxious weeds. The accompanying chart contains a summary of the results of the examination of the samples of soil referred to:—

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Origin of Sample.	Total Number of Economic Seeds.	Total Number of Weed Seeds.	Weed Seeds Named in Seed Control Act, 1905.				Other Weed Seeds.	
			Ball Mustard.	Field Turnip-cress.	Wild Oats.	Per. Sow Thistle.	Black Bindweed.	Lambs' Quarters.
Approach to Farmer's Elevator	37,976	131,602	376	376	12,764		19,176	82,120
1st inch potato ground	1,356	8,475						5,085
3rd inch "	2,376	12,181					678	7,797
Surface inch stubble	1,695	15,594					1,356	12,543
3rd inch "	2,632	4,888						4,888
Surface inch corn ground		23,651					1,412	22,239
Summer fallow 1st inch		30,711					2,118	27,593
3rd inch corn ground	706	34,917					2,471	32,446
3rd inch summer fallow	423	24,957					1,269	19,035
1st inch Gilbert Plains	282							
3rd inch "	846	1,410					1,410	
1st inch Morris	1,128	7,050		1,230	1,128		1,692	
3rd inch "	353	5,618		3,883	706	353	706	
1st inch Emerson	6,486	2,256				1,128	564	
3rd inch "	10,998	1,692					1,692	
1st inch Virden	15,806	15,906					2,358	13,548
3rd inch "	1,695							
1st inch McIvor	846							
3rd inch "	564	282					282	
1st inch clean field good summer fallow	846	846					564	282
3rd inch "	564	564					282	282
1st inch clean field poor summer fallow	564	2,256					282	
3rd inch "	1,059	353					353	
1st inch dirty field good summer fallow	564	5,922					564	5,358
3rd inch "	1,128	2,820						2,538
1st inch dirty field poor summer fallow	1,692	17,766					7,614	9,870
3rd inch "	1,410	25,944					4,230	21,714
1st inch McIvor		2,820					1,410	1,410
3rd inch "	19,176	1,692					564	1,128

The difficulty the farmer has to contend with in controlling weeds is very great on lands where weed seeds in the soil are in a proportion ranging from 200 up to 35,000 per cubic foot. A grain crop on such lands will do little more than pay for the seed and the trouble of sowing and harvesting and threshing the crop. Farmers do not always recognize that the chief problem in connection with the control and eradication of weeds is to control the supply of weed seeds in the soil. With a soil already infested, the only effective practicable cure is by means of cultivation, to bring the weed seeds within an inch, two inches, or (with some kinds of weed seeds) within three inches of the surface, so that they can be induced to germinate. The plant should then be destroyed before it has an opportunity to produce more seed, thus preventing any increase in the supply of weed seeds in the soil.

Q. What proportion would grow?

A. Our germination tests of those weed seeds were not entirely satisfactory to me. We have standard regulations to work under, to test the vitality of seeds of all cultivated crops; but we know from experience that it is difficult to induce seeds of many of the different kinds of weeds to germinate. Many of them will not germinate until after they have had a long rest period. About 50 per cent of the seeds of those weeds belonging to the mustard family were believed to be viable; with some species of them, considerable more than 50 per cent. On the whole, the wild oats that were found in the samples proved to be of a comparatively low percentage of vitality. The results obtained, in attempting to germinate these weed seeds, can scarcely be said to be accurate, because many of the seeds which did not germinate had every evidence of possessing life.

BULLETIN ON 'FARM WEEDS OF CANADA.'

During the last four years the Seed Branch has joined with the various other factors and forces in an educational campaign pertaining to the control and eradication of weeds. It is not until weeds become well established on their farms or in their locality that farmers come to have an accurate knowledge of their nature. They have then of necessity to acquire a knowledge of the best methods of combatting them. Canada has many species of weeds, but comparatively few of those species are to be found in every locality. It is much to be desired that every farmer should have the means quickly and accurately to identify any new noxious weed which may be introduced into his locality, and also to know the best means of controlling and eradicating it. The old adage, 'a stitch in time saves nine,' might reasonably be changed, when applied to the control of weeds, 'one weed pulled in time would save pulling 9,000.'

It was with a view to provide farmers with this necessary information in convenient form that I undertook, over two years ago, the preparation of rather an elaborate bulletin on 'The Farm Weeds of Canada.' With this work I am pleased to be able to say I have had the hearty co-operation, at every stage, of Dr. Fletcher of the Experimental Farm Branch. The bulletin is to contain cuts of 51 of the worst Canadian weeds and their seeds, illustrated in their natural colours. It is two years ago next month since a requisition was placed with the King's Printer for this bulletin. I regret to have to say that slow progress has been made with it. Such lithography work is necessarily slow, but, in my opinion, the work in connection with this bulletin has been unreasonably delayed.

By Mr. Wright (Renfrew):

Q. Will it contain instructions for eradicating these weeds?

A. Yes.

Q. Will the English groundsel be among the number?

A. Yes. It will be treated with in the text. As soon as the bulletin is completed it will be held for free distribution, only on personal application, and for use as a reference book in the libraries of farm homes and rural schools.

COMMERCE IN SEED GRAIN.

I need make only a brief reference to the commerce in seed grain. The great bulk of the seed grain used is grown on the farms where it is sown. A proportion of it is exchanged directly among farmers. A comparatively small percent of the seed grain used in Canada is sold in the trade. In the province of British Columbia probably from five to eight per cent of the seed grain used is sold by seed merchants; in Alberta, Saskatchewan and Manitoba, in some years as much as 10 per cent, in other years less; in the province of Ontario not more than five per cent—less than that in western Ontario, perhaps a little more in eastern Ontario; in the province of Quebec—

By Mr. Blain:

Q. Does that include clover and grass seeds?

A. No. In the province of Quebec as much as 15 per cent; in New Brunswick and Nova Scotia, fully 25 per cent, and in Prince Edward Island, less, I think, than five per cent. Why it is that the farmers in New Brunswick and Nova Scotia depend so much upon seed merchants for their supplies of seed grain, I have never been able fully to understand. There is a common impression among farmers in the Maritime Provinces that if they are to grow oats successfully—because oats is the principal seed grain that is sold in commerce there—they must get a change of seed from the province of Ontario every few years. A great deal of the seed grain that is sold for seed in the eastern provinces is ordinary grain that was grown and sold by Ontario farmers

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not for the purpose of seed but for the purpose of food or feeding. A considerable proportion of it—although that proportion is decreasing year by year—that goes down to the eastern provinces from the province of Ontario, would consist perhaps of No. 2 oats, purchased in car lots on the track, which had never been intended for seed purposes.

Our more reliable seed merchants make a practice each year of procuring from farmers seed from crops that they inspect themselves—seed from good crops. That is a good practice, and it is increasing. A much smaller proportion of the seed which enters into commerce is grown on contract for seedsmen from pure stock and specially for seed purposes.

IMPURITIES IN SEED GRAIN.

The principal noxious impurities that we find in the seed grain put on the market by seed vendors consist of wild mustard, wild oats, purple cockle, and, in the western grown wheat, ball mustard and cow cockle. The common darnel has been found in a few samples that have been sown in the west of late years. Under the Seed Control Act, seed merchants are required to place a label on all sacks or bins of seed grain that are sold or exposed for sale and which contain any of those noxious impurities, on which label the name or names of the weed seeds must be plainly written, so that farmers when buying that seed grain will have full knowledge that it contains wild oats, purple cockle, wild mustard, or whatever impurity may be contained therein and which is specified among the noxious weeds in the Seed Control Act.

By Mr. Herron:

Q. Has that law been put into effect?

A. It was quite effective last year. We propose that it shall be more effective this year.

Q. Is that in Ontario?

A. All over Canada.

Q. There is an Ontario law, but you mean the Dominion Act?

A. I mean the Dominion Seed Control Act. In the matter of seed of cereal grains the principle that is applied in the Seed Control Act is to the effect that if farmers knowingly buy for their own use seed containing wild oats, wild mustard, or other noxious weed seeds, and deliberately sow such seed on their farms, they should be given the privilege of doing so. I do not think this parliament could enact legislation that would be any help to such farmers. With seed grain and other large seeds, even a small proportion of seed of most of the noxious weeds—wild oats perhaps would be an exception when sold with seed oats—is very plainly in evidence in the seed grain itself. That is not so with grass or clover seeds, for which a minimum standard of purity in respect to those noxious weed seeds is provided in the Seed Control Act.

By Mr. Blain:

Q. There can only be a certain percentage?

A. That would apply to timothy, alsike and red clover seed only.

Q. Not to the other?

A. Not to seed grain.

By Mr. Herron:

Q. May I ask if that applies to the ordinary merchant in the country, who may buy a lot of grain from the farmers and then get it into his store and sell it? Does he come under that head?

A. If the farmer makes it clear that he wanted that grain for the purpose of seedling, it seems to me that the man who sold that grain would be liable under the Seed Control Act.

By Senator Perley:

Q. I think that a man should not be allowed to sell for seeding purposes any grain that is impure or that contains noxious weeds.

A. For several years before our Seed Control Act came into force, the noxious weed ordinance in the province of Manitoba and in the Northwest Territories prohibited the sale of seed grain containing any noxious impurities. Our Seed Control Act is not quite so stringent or so comprehensive as theirs.

By Senator Perley:

Q. What objection would there be to applying the percentage clause to seed grain as well as to clover and timothy seed?

A. It is not so necessary that we should apply the percentage clause to the seed grain. The seed grain itself would give excellent evidence of the presence of impurities, whereas the quality of grass, clover and other small seeds is difficult to judge from the appearance of them.

Q. Taking oats, very few farmers could tell from looking at them what percentage of wild oats they contained?

A. They could not accurately determine the percentage from appearance. There are, in fact, comparatively few farmers who are able to identify wild oats in the threshed grain. Most farmers in the west could; they are having a great deal of difficulty there with wild oats. We have many localities in the east where wild oats are not to be found.

Q. Then are we to understand that the law of the province of Ontario is more strict in that respect than the Dominion law?

A. There is no law that I know of in the province of Ontario that applies to seed grain. The noxious weed ordinance of Manitoba, Saskatchewan and Alberta applies to seed grain. It is older, more stringent and more comprehensive than the Dominion Seed Control Act.

Q. This law would not be of much advantage in the province of Ontario, would it, unless this change was made? What I mean to say is, it seems to me that if we are proposing to protect the farmers from purchasing grain containing wild oats and other weeds, we should make it restrictive. The point is, I can not see the object of the government in making the law so restrictive as to clover seed and timothy and leaving very loose legislation in regard to seed grain.

A. The object of the Act is to provide farmers with information so that they may be able to buy intelligently. Then, if they deliberately buy impure seed grain for their own use, the principle of the Act is that they can always do so.

By Senator Perley:

Q. Is the legislation in the Northwest and Manitoba affected by this Act?

A. Not so far as I know.

GRASS AND CLOVER SEEDS.

Fully 95 per cent of the grass and clover seed used by Canadian farmers consists of timothy, alsike and red clover seeds. Seed of brome grass and western rye grass is used in the western provinces. A very little seed of blue grass, orchard grass, perennial rye grass, and others of the European grasses, is used in British Columbia and the eastern provinces.

Our commercial supply of home-grown timothy seed is produced largely in the Georgian Bay and St. Lawrence Valley districts. In point of colour and plumpness, the timothy seed produced in these districts is not excelled any place in the world. Small lots of timothy seed are saved by farmers in all of the provinces, but the total supply of Canadian grown timothy seed is not sufficient to meet the demands of the

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trade. Then, too, in most years a considerable quantity of our best timothy seed is exported to European countries, where it is much in demand at good prices on account of its exceptionally fine appearance.

We import largely of timothy seed that is grown in the western states—Minnesota, Illinois, Wisconsin, and other states where it is grown in large areas on comparatively flat land that is perhaps better suited to the production of timothy seed than to most other crops. The seed that comes to us from those districts is smaller in berry than our best Canadian seed, but, on the whole, it is purer. There is no apparent difference in the plant. The difference in the quality of the seed is due, in my opinion, to the locality in which it is grown.

RED CLOVER AND ALSIKE SEED.

The province of Ontario is a large producer of red clover and alsike seed. In the average of years, about one half of the total output of red clover seed grown by Ontario farmers is exported, and considerably more than that of the alsike seed. The Ontario supply of alsike seed may be said to control the world's prices for that article. Very little red clover seed is grown in eastern Ontario or in any of the other provinces, although both red clover and alsike seed of superior quality may be profitably grown in eastern Ontario, the greater part of Quebec, and in parts of the western provinces.

Europe is our natural market for clover seeds. The principal countries in which clover seeds are produced in quantity, and from which countries large supplies are offered in the European market, are the United States, Canada, Great Britain, Continental Europe, Chili, and New Zealand. In point of purity, the Canadian grown article is not excelled by any country in the world, being, as it is, entirely free from dodder seed of any kind; but in the European market the American (including Canadian) grown red clover seed will not bring within two or three cents a pound as much as the English, French and Chilian grown seed, of equal quality in point of purity. The red clover plant produced from the American seed differs materially in appearance and in quality for forage or fodder purposes from the clover plant produced from the French, Chilian and English grown seed. Because of that Canada will this year derive considerable benefit from the importation of English and Chilian grown red clover seed, which is being brought in very largely this year because of the failure in the American red clover seed crop of last year. I would say that fully one-half of the red clover seed that will be used in Canada during the present year will be an imported article.

By Senator Perley:

Q. Is that inspected?

A. It is inspected when it is offered for sale for seeding. It is not officially inspected when it is imported, except that we receive for test in the seed laboratory an average of about 40 samples per day. It is from an examination of these samples that I am able to form an opinion of the proportion and quality of red clover seed that is being imported. I have here to show you some samples representing bulk lots of red clover seed that has been imported during the last month. You will note that it is not difficult to differentiate between the English, Chilian and American grown seed.

There are several varieties of red clover. Our seedsmen catalogue both common and mammoth red clover; but, as a matter of fact, no person can determine from the appearance of the seed whether it be of the mammoth or common variety, and the information that our seed merchants ordinarily have on the identity of the variety is very murky. The two varieties will cross-fertilize naturally, and—except it be in a very few localities where mammoth red clover is almost exclusively grown—I do not think we have any source of supply of even a reasonably pure mammoth red clover seed. When farmers order mammoth red clover, they are usually supplied with either the common variety or with something that is true neither to the common red or to the mammoth red varieties.

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In the samples I have shown you there are three qualities of seed in each of the three lots—No. 1 seed, seed of intermediate quality, and seed that would be prohibited under the Seed Control Act. These samples were selected especially to illustrate to you that it would be difficult for any person, unless he be an expert, to determine from the appearance of the seed whether it be foul with noxious weed seeds or not. If a farmer were to sow ten pounds per acre of clover seed of the quality contained in those bottles labelled 'prohibited,' he would be sowing seed of some of the worst Canadian weeds at the rate of about 15,000 per acre.

ALFALFA SEED.

The amount of alfalfa seed that is being sold in Canada is rapidly increasing from year to year. A small quantity is being grown in the province of Ontario and in Alberta, but our supply comes chiefly from the southwestern states. The state of Utah is a large producer of alfalfa seed. A great deal that was put on our markets some few years ago was of low vitality. Much of the alfalfa seed that is imported from the western states contains a species of dodder which we have lately learned will thrive in the climate of southwestern Ontario.

THE EFFECT OF SEED CONTROL.

I desire now to devote a few minutes to the consideration of the world's supply of grass and clover seeds, the systems of seed control in foreign countries, and how they have reacted and effected the quality of seed offered in our Canadian retail trade. Grass and clover seed may be said to be a speculative article of commerce. Hamburg is the one great central seed market of the world. Supplies of grass and clover seed may be obtained there from any country where they are produced. In those European markets seed of the very best quality of all kinds of crops is offered to wholesale or retail buyers. During the last 25 years there has been a gradually increasing spread in the price between seed of the best quality and the lower grade article. That spread in price was brought about largely by the systems of seed control, voluntary or otherwise, which obtain in most of the European countries, by which systems the farmers in those countries are able to procure with their seeds a statement of guarantee as to their purity and vitality. Those systems of seed control may be said to have grown out of the establishment of seed control stations, or seed laboratories, which are numerous throughout most of the European countries and which do work quite similar to our seed laboratory which was established in Ottawa five years ago. It is largely on account of the work that has been done during the last 25 years by these European seed testing stations, or seed control stations as they are called in Europe, and the guarantee systems which have grown out of that work, that farmers of Europe will not buy and use seed of the lower grades. In consequence, the cleanings from the world's supply of grass and clover seeds, gathered together each year in the European market, are offered at a much reduced price to the wholesale trade in those countries where they have no system of seed inspection or seed control.

Prior to the enactment of our Seed Control Act, Canada was receiving a share of the cleanings and the low grade grass and clover seeds from foreign countries. But what would seem to us to be even worse, the cleanings from our own home-grown seed, which is now largely re-cleaned in Canada, was retained and offered in our Canadian retail markets to Canadian farmers, and the superior re-cleaned article was exported to Europe. Who will say that our Canadian seedsmen were entirely to blame for this condition of affairs? They were handling the seed that our farmers produced, and they were supplying them an article which the farmers demanded. That is to say, the great bulk of the farmers living outside of the districts where clover seed is largely grown, demanded a cheap article and were supplied with an article of low price per bushel, though an article very dear at the price. That condition of affairs

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was due almost entirely to ignorance on the part of seed users, and that brings me back again to the statement that the real worth of grass, clover and many other kinds of seeds can not be judged from appearance, except perhaps, by experts.

By Senator Perley:

Q. Has that been done in Ontario?

A. Yes. The province of Ontario is the natural base of supply for the clover seeds used in Canada.

CLOVER SEED MARKETS.

The principal markets for the cleanings and low grade grass and clover seeds were in eastern Ontario, to a limited extent in the province of Quebec, in the provinces of New Brunswick and Nova Scotia in particular, and, to a lesser extent, in Prince Edward Island and British Columbia. When the Seed Control Act went into force in September, 1905, the problem of our Canadian seed merchants was, 'How can we do business under the Seed Control Act if we are deprived of a market for our cleanings and seed of poor quality?' The demand from European countries for seed of high quality still continues to be good and deserves to be fostered. The prices offered in those countries for superior grass and clover seeds are in advance of what our Canadian farmers have paid and seem to be willing to pay for seed of the same quality. The problem with the seedsmen was, 'If our natural market desires only a continuance of the supply of the best article and only a reasonably good article is to be sold in Canada, what is to be done with the lower grade seeds?'

Since our Seed Control Act came into force, Canada has no longer been the dumping ground for the cleanings of grass and clover seeds produced in foreign countries. I have no doubt that the cleanings from our own home-grown seeds have been offered for export in any country where there is a market for them. It is said that a considerable proportion of the cleanings of Canadian seed is now going to the European market, where it is again cleaned and offered for sale in any country that desires seed of that quality. The result of the Act to the Canadian clover seed producer has been a marked spread in price between the clean article and seed grown on land foul with weeds. That, in my opinion, will have a good ultimate effect. It will tend to encourage the production of clover seeds on clean land and to stimulate other farmers to an application of methods of controlling the noxious weeds on their farms.

NEW WEEDS THAT ARE BEING INTRODUCED.

In the red clover seed that has been imported this year, a few species of weeds that are comparatively new to Canada are being introduced. Dodder is very prevalent in the seed coming from Chili and from England. This particular species of dodder is known as the *Cuscuta Ramosa* in Europe. Here is a pressed and mounted specimen of it. It is a narrow gut-like plant which grows from seed and winds itself around the leaves and stems of the clover plant, from which it obtains its nourishment. I have definite knowledge that this species of dodder has been introduced and quite largely sown in Canada at least during each of six years in the last quarter of a century. The fact that we have never detected a single grain of dodder seed in any Canadian grown red clover seed should be good evidence that our Canadian climate is too rigorous for this species of the red clover dodder. I have made considerable inquiry of botanists, who have had much to do with the examination of clover seed during the last 15 years, and I do not know of any person who has ever found dodder in Canadian grown red clover seed. Except for our Pacific Coast climate, and perhaps a small section along the front of Lake Erie, I feel quite safe in saying to our farmers that they need have no serious fear of any permanent trouble from the dodder seed which will be largely distributed in the red clover seed offered

in the trade this year throughout Canada. The farmers of the south of England could not be induced to buy red clover seed containing dodder seed. It is legislated against more than any other weed. It would mean the failure of the clover crop to sow clover seed containing a large proportion of dodder in a climate where dodder will thrive. On the other hand, the farmers in the north of England and in Scotland have learned that they have no reason to fear the dodder that gives so much trouble in the south of England. According to the evidence that was taken before a select committee appointed by the Board of Agriculture of Great Britain, to investigate the conditions of the seed trade, dodder will not thrive in the climate they have north of about *Croft* in England.

Another impurity that is quite prevalent in the seed that has been imported is known as fool's parsley, a species of plant resembling the wild carrot. Clustered dock, a species closely allied to the ordinary curled dock, is also very prevalent in some of the imported seed. We have yet to learn whether these plants which are noxious weeds in other countries will prove to be noxious weeds in Canada. They are not named in the Seed Control Act, and we are therefore unable to place any restrictions on the sale of red clover seed containing them.

By Mr. Blain:

Q. Are we to understand that the Seed Control Act does not apply to exported seed, but only to seed that is sold for seeding in Canada? What is your opinion of the export trade under that condition?

A. Our natural export market for grass and clover seeds is in Europe. Whatever low grade seed is exported from Canada to Europe would probably be re-cleaned by a slow process with intricate machinery and cheap labour. In view of the statements recently made by Representative Mann in the House of Representatives at Washington, we would have reason to conclude that some of our cleanings have been exported to the United States. The United States produce more red clover seed than is produced in Canada; but if they sell their good seed abroad and keep their own screenings at home, because they are cheap, and want to buy cheap seeds from Canada, I do not see why any serious objection should be raised—at least by those of us living on this side of the boundary line.

Q. Is it not just as likely to be the other way?

A. Low grade seed is not permitted to be sold in Canada, under our Seed Control Act.

Q. Have they no Seed Control Act in the United States?

A. No, but there is a Bill at the present time before the House of Representatives at Washington looking to this end.

Q. You think it would not be wise to apply the Seed Control Act to the export trade?

A. As yet I think it would not be advisable. It may perhaps be advisable at some future time, say five or ten years from now. In the first place, what are noxious weeds in Canada may not be noxious weeds in the countries to which we export our seeds. Our seed merchants of necessity have to handle what our farmers produce. With the protection now afforded to farmers, under our Seed Control Act, further progress will necessarily rest in the improvement of the quality of the seed produced. In that matter we have been directing, and will continue to direct, our best efforts towards improving the quality of our Canadian grown supply; but that is a slow process, especially on account of the expense for farm labour.

Q. My point is, we are passing a good deal of legislation to take care of our natural products, and it does seem to me that we should be a little more careful of our export trade in seeds, particularly as we are a young country.

A. I am not so well acquainted with the other legislation, but, so far as I am acquainted with it, that legislation is intended mainly to prevent misrepresentation and fraud.

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Q. It would be fair, I suppose, to take the apple trade and the butter trade as samples? We are particularly careful of the quality of the apples, the butter and the cheese we export.

A. But there is a difference. With those perishable articles, our Canadian merchants cannot very well send samples to merchants in foreign countries, so that the purchase made could be based on the sample submitted, as is done in the seed trade.

Q. But if the Canadian producer can find a ready market for inferior seed, there is always a danger that some portion of it will be sold to our Canadian farmers; and, furthermore, we shall never be able to build up a very important export trade.

A. We now have a good export trade in clover seeds. It is desirable that that trade should be fostered.

Q. I suppose it is quite possible to make it greater.

A. Yes. The production of clover seed is a money-making industry to the Ontario farmers. There is perhaps greater danger of crop failure, such as occurred last year, in the crop of red clover seed than in some other crops. I hope to see in future years red clover seed of good quality more largely produced in eastern Ontario, in Quebec, and in some districts of the western provinces. There is no reason why we should not double or treble the output from our clover seed crop. It is a crop that takes very little nutriment out of the soil and gives excellent returns in the average of years.

APPLICATION OF THE SEED CONTROL ACT.

I come now to the subject of the enforcement of our Seed Control Act. In that Act Parliament has given us a limited control over the trade in certain of the agricultural seeds, when they are sold for seeding in Canada. Our seed merchants have the right to import or export seed of any quality they see fit or can get a market for; but before such seed can be put on the market for the purpose of seeding in Canada, it has to conform to the provisions of the Seed Control Act. With the large seed cleaning plants we have in Canada, any Canadian seedsman can take foreign grown seed and reclean it, so that it will conform to our Seed Control Act. It is my duty, and that of the officers who are working under my direction, to see to it that the provisions of the Act which we consider to be reasonable are respected by seed vendors in all parts of the country. We have had a little more than one year's experience with the Act and I am able to say now that we have found some problems that give us considerable difficulty.

Properly-called seedsmen of Canada are as honourable and as careful as the seedsmen in any other country in the world. At the head of most of the seed houses in Europe we find men who are excellent authorities on botany, plant breeding, seed selection, and the production of seed of all the various kinds of field and garden crops. We have a few such men in connection with our seed houses. As a reference book in farmers' and gardeners' homes, their catalogues are used perhaps more than any other book. They are edited and published by the seed firms at considerable expense and for the one purpose of extending their trade. The more reliable seedsmen, who place a high value on their reputation, exercise reasonable care, so that the information contained in their catalogues, as to the relative value and methods of culture of the various kinds and varieties of seeds offered for sale by them, is fairly correct and may safely be taken as a guide for amateurs. But unfortunately, there are a great number of seed catalogues distributed throughout Canada which contain glowing accounts of the characteristics and capacity for giving large returns of certain so-called new kinds and varieties of crops, but which afterwards prove to be either a worthless article or an old variety, sold at high prices under a new name. A great many farmers and gardeners who desire to get rich quick, or who delight in getting ahead of their neighbours in the matter of securing new kinds, are lured by such advertisements. Such catalogues, issued by unscrupulous seed vendors—some of whom are located in this country—bring temporary profit to them.

Seed vendors of the type I have referred to are usually termed 'jobbers' in the trade. Their main business is very often of an entirely different character. Particularly is this true of the jobbers in grass and clover seeds. There are many wholesale grocers who, although they have but little knowledge of what constitutes quality in seeds, import and distribute large quantities of them. Judging from the evidence that we have gathered in connection with enforcing the Seed Control Act, I would say that the main object of a great many of those jobbers is to secure an immediate profit in handling such seeds. In the past, the margin of profit from the sale of low grade seeds was greater than that obtained from selling seed of superior quality. A great deal of the red clover seed imported this year will come very close to the minimum standard of quality fixed in the Seed Control Act, below which such seeds are not allowed to be sold.

By Senator Perley:

Q. Let me ask you one question. What is the relative productive capacity of those noxious weeds compared with the good seed?

A. The weed seed may produce from 25,000 to 50,000 seeds. One clover plant would produce between 100 and 500 seeds.

By Mr. Blain:

Q. How do these importers get rid of this inferior seed under the Seed Control Act?

A. I said that what they imported came very close to the line. That seed can be put on the market and sold so long as it is not below the line.

I venture to say that were it not for our Seed Control Act this year, a great deal of the red clover seed that has been imported would have been of much inferior quality. I have had the privilege of examining several lines of samples of red clover seed that has been offered to our Canadian merchants from various foreign countries. From those samples our importers have had an opportunity to purchase abundant supplies that would grade No. 1, under our Act. But it is true that the great bulk of the seed offered has been of inferior quality. What I have tried to make clear is that those of our importers who care little about maintaining a good reputation as sellers of good seeds have exercised care only so far as has been necessary to protect themselves under the Seed Control Act. Perhaps fifty per cent of the red clover seed imported during the last two months is of this intermediate quality. Our more reliable seed houses have been careful to bring in only a high grade of seed. This they will have to sell in competition with the poor seed which will look almost as well in the eyes of the farmer and a great deal of which will be sold under the name 'Government Standard,' because it conforms to the minimum standard of quality fixed in the Seed Control Act.

Since the year 1902 we have each year collected a large number of samples of grass and clover seeds for investigation purposes, procuring in each case information as to the source of supply. As a result of the information obtained from such investigation work, we have found a few distributing points which are sinners above all the rest in selling low grade seeds, screenings, and other seeds of inferior quality that are sold by jobbers, not by seedsmen, properly called. First among those points I would mention the city of St. John, N.B. Halifax is bad enough too, and we have found considerable quantities going out from Montreal. We have done what we can and we propose to direct our efforts as best we may to educating the farmers in the districts where that seed is disseminated, as to the folly and false economy of buying such a low grade article. We purpose during the coming season to be less lenient with the enforcement of the Seed Control Act than we were last year. During the past season we adopted the plan of the Inland Revenue Department and published a small pamphlet giving the names of persons who had violated the Seed Control Act. No sample of seed was taken by our inspectors from any seed house except in the presence of the

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person who owned the seed or his agent. Furthermore, no seed vendor was published for having violated the Seed Control Act until after he had been visited once and fully warned, and visited a second time and found, through carelessness or design, to be ignoring the Act.

ROOT CROP AND VEGETABLE SEEDS.

All of our supplies of root crop seeds which enter into commerce are imported from Europe. We cannot determine from the appearance of those seeds whether they will produce a good or a poor crop; but from observation we know that there is a great deal of difference in the quality of the crops produced. Our importers of these seeds have the choice of buying high class seed from selected stock or buying a cheaper article of questionable quality. Competition in the trade in these seeds is restricted far too much to the matter of prices and not enough consideration is given to quality. In examining crops of turnips, mangels or carrots throughout the country during the summer months, we find a vast difference in the crops produced from different stocks of seed obtained from different seed houses. All that we can say to our farmers is that until we can produce our own supplies of these seeds, they will have of necessity to depend alone on the reputation of the seed merchant from whom they purchase.

By Mr. Wilmot:

Q. Do the prices of these seeds vary much?

A. In root crop seeds, not nearly so much as they should.

Q. I had the idea that they were uniform, or nearly so.

A. They are nearly uniform. Some of our best seed merchants put up their best selected stocks in pound packages in cardboard boxes; but there is a constant danger to them that their less scrupulous competitors may adopt the same practice and the farmer may be at a loss to know which is the genuine article.

Q. The same thing will apply to the sale of clover seed?

A. Yes. The competition is restricted altogether too much to prices. That would apply also to garden vegetable seeds, but with these we have put on the market many kinds that are extremely low in vitality. There are some kinds of garden vegetable seeds which are useless when more than two years old. No one supposes that the stocks left over from year to year are wasted. There are only a few seedsmen in Canada who do not mix them with their fresh seeds. Such mixing would increase the bulk and the weight and would perhaps save the farmer or gardener from thinning the plants in the row. At least the plants from a great deal of the onion and parsnip seeds we have collected and tested would be far apart and few between in the rows. Purchasers of root crop and garden vegetable seeds should demand from their seedsmen a statement of the percentage of vitality. With such information, farmers and gardeners would know exactly where they were at, before sowing. All reliable seedsmen have that information to supply, and there is no good reason why they should not give it to their customers. Farmers and gardeners should not purchase their supplies from men who have not got or are not willing to give that information. The accompanying chart contains a list of the common vegetables, the temperature at which their seeds should be germinated, the time required for the germination test, and a standard of germination for good seed. In unfavourable years some kinds of seed would fall considerably below this standard; but, in my opinion, seed should not be used if it will not germinate within 5 per cent, or at least 10 per cent, of the standard for good seed that is given in the accompanying chart.

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Name of Seed Vegetables.	Temperature for Germination.	Time Required.	Standard for Good Seed.
	Frht.	Days.	Percent.
Asparagus..	68.86	14	85
Beans ..	68.86	10	90
Beets ..	86.86	14	90 balls, 160 sprouts.
Cabbage ..	68	10	93
Carrot ..	68.86	14	90
Cauliflower..	68	10	90
Celery ..	68.86	14	60
Corn, sweet..	68.86	10	95
Cucumber..	68.86	10	90
Lettuce ..	68	10	90
Musk melon..	68.86	10	90
Onion..	68.86	10	90
Parsnip..	68.86	14	65
Peas ..	68.86	10	97
Pumpkin..	68.86	10	85
Radish ..	68	10	95
Salsify ..	68.86	10	85
Spinach ..	68	10	90
Squashes ..	68.86	10	90
Tomato ..	68.86	10	90
Turnip ..	68	10	95
Water-melon..	68.86	10	90

Mr. Chairman and Gentlemen, I thank you for your kind attention.

Having read over the foregoing transcript of my evidence, I find it correct.

GEORGE H. CLARK,
Seed Commissioner.

TESTING QUALITIES OF WHEATS AND FLOURS.

HOUSE OF COMMONS,

Committee Room 34,

FRIDAY, February 22, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day, Mr. MacKenzie, Chairman, presiding; Dr. C. E. Saunders, Experimentalist, was present by citation and addressed the Committee as follows:—

DR. C. E. SAUNDERS: Mr. Chairman and Gentlemen, I understand from the communication received from the Secretary of the Committee, that you wish me to present to you any information I may be able to give in reference to deterioration, real or supposed, which occurs in the case of wheat which is exposed to the weather for a considerable period of time before being threshed, as sometimes happens in our western provinces. So far as direct investigations are concerned, I have no definite figures to present to you in this connection; though some of the researches which I have carried on may give some clue to the solution of this problem. The question is, however, a very complicated one, for the reason that the quality of each weathered sample would depend upon a number of conditions. The variety of wheat shown, the nature of the soil and the general character of the season would all exert considerable influence, as well as the weather, while the crop was in stock. The researches (reported in Bulletin No. 50 of the Experimental Farm Series) in regard to the quality of the different grades of wheat, showed that lower grades than those commonly milled, gave a fair yield of flour of very good quality. The very lowest grades gave rather poor flour, but even as far down as number 4 grade, it was found possible to obtain a considerable yield of very good flour. From the facts established the conclusion was drawn, that if the public were willing to pay a fair price for flour not quite of the very best appearance, the millers should be able to pay higher prices than were then prevalent for some of the lower grades of wheat. In addition to the regular grades, a sample of frozen wheat was tested and it was found that even this unattractive sample yielded flour from which excellent bread was made. If wheat and flour were always sold strictly according to their value, and if the public were not willing to pay a somewhat higher price for a better looking article, even though not really superior in any other respect, then the problem would not be very difficult. The commercial value of wheat and flour could be determined by analyses and tests.

APPEARANCE NOT A RELIABLE TEST OF QUALITY.

But wheat and flour are judged by appearance rather than by actual quality, and a better appearance nearly always brings a higher price. The general opinion is that our western Canadian wheat is of the highest quality when it is very hard and of a bright but dark reddish colour. Paleness, whether due to the character of the variety sown, to the soil, or to the weather, is considered to be a sign of poor quality. Now I should not like to say that there is no element of truth in this idea, but I do say, most emphatically, that the exceptions to the rule are so very numerous that it is an extremely unsatisfactory basis for grading wheat. So long, however, as wheat is judged chiefly by appearance and so long as the most fashionable colour is dark, bright reddish-brown,

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it will be very difficult indeed to sell at its full value, wheat which is of a somewhat paler colour.

A similar difficulty presents itself in the case of flour. In order to bring the highest price, it must be of such appearance as is popular at the present time. It must be bright and of rather a pale cream-colour. Now, it may be that the weathering of wheat causes a certain amount of brittleness in the brand, and if so, there might be some difficulty in producing from such wheat, as large a quantity as usual of flour of the best colour. It seems to me highly improbable that the weathering would, in most cases, appreciably lower the baking strength of the flour produced from the wheat; but it might perhaps slightly reduce the yield of high grade flour judging the grade by colour only.

DETERMINATION OF STRENGTH IN FLOUR.

When studying the grades of wheat two years ago I felt very keenly the need of some satisfactory definition of flour strength and of some regular system for determining it and expressing it numerically on a simple, fixed scale. Much work is done, in connection with some of the large flour mills, in testing the flour produced; and a few scientific investigators have studied flours with some care; but there is no system or scale in general use for the expression of flour strength, and most of the work done in that direction has been entirely empirical and unsatisfactory. Finding it imperative to establish a scale of strength, I have been working on the problem for a year or more, and have reached a fairly satisfactory solution of it.

The mark which I give to any flour to designate its strength is based on the amount of water it absorbs when made into dough, the amount of water retained after the bread is baked, the volume of the loaf, its shape, the form of the crust and the texture of the inside of the loaf. All of these factors are carefully determined by repeated bakings, and the figures obtained are then brought together in such a way that one number, which may be said to be the average of them all, is derived from them. I shall not attempt to give you the details of the method, but these few words of explanation may serve to give you a general conception of it.

Strength in flour may perhaps be roughly defined as the ability to take up and to retain water and to produce a large, high loaf with a regular, even crust and fine texture. The strongest flours give a comparatively close texture even when the bread is extremely light, the cell-walls (if the term may be used) being of course very thin.

The scale of points for flour strength, based on the observations referred to, run from about 70 to 100, but is not limited in either direction. One hundred represents, not perfection, but simply a flour very high in strength. Seventy represents a flour very low in strength. Exceptional flours may obtain a mark above 100 or below 70, but these figures are the usual limits. This method of determining and expressing strength is largely free from empiricism and is primarily an expression of fact rather than opinion. Using this system it becomes possible to accurately express and permanently record the strength of each flour. Comparisons can therefore be made between flours from different classes of wheat, and the quality of flour produced in one season can be compared with that of other years. The so-called 'standard' flours, which have been used for purposes of comparison in spite of the fact that their strength varied with their age, are quite unnecessary when this system is used.

The objects in view in carrying on these researches in flour strength may be briefly stated to be:—

First:—To enable us to select the most desirable sorts of wheat from the large number of cross bred varieties constantly being originated at the Central Experimental Farm, and from the new sorts which are imported.

Second:—To test the varieties of wheat generally cultivated in Canada, to ascertain which of them should be continued and for what purpose.

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Third:—To determine to what extent the strength of any variety is affected by soil, climate, use of fertilizers, exposure to weather when in stook, storage after threshing, &c.

A complete study of all these problems would take many years. All that I can do this morning is to present to you in a preliminary way a few of the facts which I have thus far established.

PURPOSES FOR WHICH WHEAT IS USED.

It would be well, perhaps, before going further, to say a few words about the different purposes for which wheat is used. Bread-making is no doubt the chief of these. For this, a flour of great strength commands the highest price both because it will usually give light bread even in the hands of a careless baker and because its (usually) high-water absorption enables the baker who sells his bread by weight to dispose of a relatively large quantity of water at several cents per pound. For household purposes, however, it is doubtful whether wheats of medium rather than the very highest strength are not to be preferred. Biscuits, cakes, pies, &c., are undoubtedly more wholesome and satisfactory when made from flour of medium or of no strength. Somewhat starchy flours rather low in gluten, are perhaps best for these purposes. For the making of cereal breakfast foods, many of which consist largely or altogether of rolled wheat, the manufacturers prefer varieties with plump round berries and a yellow skin. The presence of a considerable quantity of gluten is said to be also an advantage from the manufacturers', as it certainly is from the consumers' point of view. Wheat is also used for the production of macaroni for which purpose very hard, glutenous sorts are found most satisfactory.

You will see, therefore, that it is not strictly accurate to speak of the *strongest* wheat as the *best*. It is best only for certain purposes. Inasmuch, however, as very strong wheat is rather scarce in the world's markets, it usually commands a high price. Farmers should select the variety of wheat they grow, just as they would select an animal, for the particular purpose for which it is required.

APPEARANCE OF WHEAT NOT A GOOD INDICATION OF FLOUR STRENGTH.

I have brought with me a few samples of different sorts of wheat bearing out my contention that it is impossible in many cases to form a fair idea of the quality of the sample of wheat from its appearance. If we know the variety we can form a better estimate than without that knowledge; but even under the most favourable circumstances we run the risk of making serious mistakes. (Samples were here exhibited).

Here, for instance, is a beautiful dark red sample of wheat grown at Ottawa last season, the baking strength of which is only 80 and another good sample of somewhat similar appearance with a baking strength of only 75. Here, on the other hand, is a sample of rather poor appearance which earned 99 marks and another extremely poor looking sample which earned 90 marks for strength. Such instances could easily be multiplied. They all serve to emphasize the fact that appearance is often a very poor guide as to baking quality. If, however, we are comparing only different samples of the same variety, appearance is less untrustworthy than when we deal with different sorts. But even then it cannot be depended upon.

You will understand that I am discussing only the question of the strength of the flour obtained, not the yield of flour. This latter is a point of very great importance to the miller; but, as a rule, there is much less relationship than is usually supposed between the yield and the strength of the flour.

VARIATIONS IN FLOUR STRENGTH DUE TO SOIL, CLIMATE, AND OTHER CAUSES.

A few determinations of the strength of flour have been made upon the same varieties grown under different conditions. This winter (in studying Red Fife of last

season's crop) I found a good, hard sample grown at Indian Head, and weighing 63 lbs. per bushel, which earned 95 marks for flour strength, whereas our selected Red Fife at Ottawa earned 102 (a little better than strictly first class) though it weighed only 59 lbs. per bushel, and was a much less attractive sample than that grown at Indian Head.

Pringle's Champlain, grown at Indian Head in 1906, and weighing 63 lbs. per bushel, earned 80 marks for strength, and the same variety grown at Ottawa in 1906, and weighing 61½ lbs. per bushel, earned 93 marks.

That Ontario spring wheat is of very high quality (when the best varieties are grown) is clearly evident from these figures. It is also noteworthy that Turkey Red winter wheat grown at Ottawa in 1906, surpassed by 11 marks, Turkey Red, grown the same season near Lethbridge (a distinctly harder sample). In this case, however, I cannot guarantee the purity of the Lethbridge sample. It may not be pure Turkey Red. The Ottawa sample earned 98 marks.

By Mr. Schell (Oxford):

Q. Those tests would indicate that the Ontario wheat was better in baking strength than the wheat grown in the west?

A. Yes, we cannot avoid that rather remarkable conclusion. It is quite contrary to ordinary belief; but having had indications of it before, it does not come altogether as a surprise to me. Last winter, in studying different samples of pure Red Fife, I found a strength of 89 in a very soft sample grown near Neepawa, Manitoba, and a strength of 100 in a very hard sample grown in the same district. From these two cases one would judge that an average sample, grading No. 1 Northern, would probably have shown a baking strength of about 96 to 98. A sample of early Red Fife grown at Ottawa that same season, and not of very fine appearance, gained 99 marks for strength. I may say also that the finest flour I have yet made was from a sample of Red Fife grown here in 1902. Of course it has probably improved with age. When baked this winter it earned 107 marks. It was not a very particularly good looking sample of wheat, being rather soft.

By Mr. Blain:

Q. Of what age?

A. The wheat was grown in 1902, the flour was made this winter.

By Senator Perley:

Q. How much did that wheat weigh to the bushel?

A. Sixty-one pounds.

IMPROVEMENT OF WHEAT AND FLOUR WITH AGE.

By Mr. Blain:

Q. Can you say up to what age wheat and flour both improve?

A. The work I have done on that problem is not yet sufficient to enable me to answer your question. Of course much would probably depend on the conditions, as to moisture, temperature, &c., under which the material was kept. It is well known that new wheat, and flour made from new wheat usually gain strength with age, but there is very little definite information obtainable on that subject. In order to avoid errors arising from differences in age, I compare only the wheats of the same seasons, and make the baking tests not earlier than the middle of the winter. In this way it is believed that trustworthy comparisons are made.

The case of Red Fife grown at Ottawa in 1902, which was referred to a few moments ago is no doubt an instance of improvement with age. Another case of very striking character I discovered this winter. One of our new cross-bred wheats, which

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goes by the name of Yellow Cross, showed a baking strength of 82 when tested a year ago, the wheat having been grown at Ottawa in 1905. Some of the flour was kept over and was found this winter to have gained remarkably in strength, earning 102 marks. That is to say, it improved from rather below medium strength to rather above first-class strength during the year.

I hope to take this problem more fully in the near future in conjunction with Mr. Frank T. Shutt, the chemist of the Experimental Farms, who wishes to study the chemical aspects of the matter.

It is the usual practice of millers to save some old wheat to mix with the new wheat which they are grinding during the autumn months; because they know that the new wheat is not usually so good at that time. This question of age complicates the problem as to the relationship between grade and quality. I might also point out that the improvement of wheat with age suggests the possibility that, in case a large part of our western wheat should ultimately be exported by some northern route, ten or twelve months after harvest, the cost of storage might be partly or entirely covered by the gain in quality.

GRADING WHEAT BY APPEARANCE.

The facts which I have brought to your attention this morning serve to show the extreme difficulty of grading these by appearance. The system of inspection and grading now practised is certainly of considerable value, but is by no means as accurate as many people suppose. The ideal method of grading would be to consider both the flour yield and the quality of the flour, and in that connection the age of the wheat would be a very important factor.

By Mr. Thompson:

Q. Is there such a method?

A. Yes, it is quite practicable in a well equipped laboratory.

Q. Is there a simple method by which the buyer could grade in that way?

A. No such simple method has been worked out for inspection purposes. The cost would perhaps be prohibitive, and in the case of new wheat the baking strength would probably improve so much in a couple of months that the original inspection tests would operate greatly to the disadvantage of the farmer, and to the advantage of the European buyer, except when the farmer was selling old wheat.

Q. That difficulty does not occur under the present system, which is based on appearance?

A. Appearance is, to a certain extent, a safe guide in many cases, but it cannot by any means be entirely relied upon.

By Senator Perley:

Q. In the inspection it is required that grain should be a certain colour?

A. Yes, there is a prejudice in favour of a dark red colour and a bright skin, and the result is that such an admirable wheat as White Fife (fully equal in my opinion to Red Fife) does not receive in Canada the approval it merits.

Q. We have in our country wheat of a bright, nice colour indicating Red Fife, which weighs 60 lbs. to the bushel, and will grade No. 1 Northern. We have other samples of the same class which will weigh 62 lbs. to the bushel, but having been out in a storm in the same field, or having been moistened by the dews, the colour is not so bright and the grade will be brought down to No. 2, lower by 2 or 3 cents, than the wheat which happened to be threshed before the storm. It is all in the colour there.

A. It is altogether probable in such a case that the sample having the greater weight per bushel is worth quite as much as the other in spite of its inferior appearance. But the milling difficulties may be greater in producing from it flour of equally fine colour, and flour, as I have already pointed out, is judged largely by colour.

Q. The flour that makes the best bread will soon get the market.

A. It ought to do so, but there is a strong prejudice in favour of very pale, bright looking flour.

By Mr. Schell (Oxford):

Q. Would flour that tests 100 according to your scale be worth 10 per cent more than flour that tests 90?

A. Not necessarily. On that scale 100 merely indicates that the flour is of remarkably high strength and 90 indicates a flour of good but not unusual strength. For general household purposes the flour grading 90 would be preferable to the other. In my opinion better bread can be made from some of the flours not remarkably high in strength, but such flours require the use of a little more care and judgment on the part of the baker.

Q. What would be the difference in value basing it upon nutritive qualities?

A. The strength would not necessarily have any relation whatever to nutritive qualities. Some highly nutritive flours are of very low strength.

Q. Do the weaker flours take up as much water when made into bread, as the stronger ones?

A. As a rule, they do not, I believe, but sometimes a flour shows very good ability to produce a large loaf of good form and texture when the water absorbing power of the flour is not high. Such flour can fairly be called strong even though deficient in one of the usual signs of strength.

By Senator Perley:

Q. How much water is there in a pound of bread?

A. 100 lbs. of strong flour will usually make about 140 lbs. of bread, but the exact amount will, of course vary greatly according to the circumstances.

By the Chairman:

Q. I was going to ask you if, from your experiments with Alberta Red wheat at Ottawa you would recommend the Ontario farmer to experiment with it?

A. Turkey Red wheat, which is the principal variety sold under the name of Alberta Red, is pretty well known in Ontario, but I think it should receive much more attention than it does at present. I believe that Ontario farmers would receive higher prices for their winter wheat if they were to grow Turkey Red instead of the more common sorts. It might not, however, give so large a crop as some of the poorer kinds.

By Mr. Schell (Oxford):

Q. Did you include any samples of Ontario wheat, west of Toronto, in your test?

A. I tested one grown near Hamilton. It was a very weak variety, suitable for biscuits and pastry, but not for bread.

Having examined the foregoing transcript of my evidence, I find it correct.

CHARLES E. SAUNDERS,
Cereal Experimentalist.

CANADIAN PRODUCTION AND EXPORT OF APPLES

HOUSE OF COMMONS,

COMMITTEE ROOM 34,

OTTAWA, WEDNESDAY, February 27, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 o'clock a.m., Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—The witness who is before the committee to-day, is Mr. A. McNeill, Chief of the Fruit Division, of the Department of Agriculture, who proposes to furnish evidence on the present conditions of the Canadian apple trade under the following heads: (1) The Early Apple and its Markets; (2) By-products in Orchard-ing, and (3) Co-operative Sale Associations. I have much pleasure in introducing Mr. McNeill.

Mr. McNEILL.—Mr. Chairman and Gentlemen, the subject, as you will admit, is a somewhat wide one if we embrace the apple industry in its entirety. I have therefore deemed it wise to make the three headings mentioned for the purpose of economizing in point of time. The Early Apple and By-products appear to me to be somewhat neglected and co-operative selling associations, I am persuaded, will furnish a remedy for very many evils that I wish to point out in connection with the first two headings.

1906 A SUCCESSFUL FRUIT SEASON.

Before taking up the subject proper, permit me to say this much with reference to the fruit trade in general. The season of 1906 has been a particularly successful one for fruit-growers—of both small and tree fruits. The crop has not been exceptionally large but prices have been such that it is doubtful whether in any previous year more money has been returned for the capital and labour invested.

APPLE EXPORTS FROM CANADA.

The apple trade is somewhat irregular. The exports from Canada depending as they do upon the crop here as well as in all other apple producing countries, must of necessity be a very varying quantity. I have here a tabulated statement of the apple exports from Canada for the years 1895 to 1906, inclusive, in which you will see there has been a gradual increase. Some years it has been a little more and other years a little less, but the constant tendency over the whole series of years has been towards an increase in the exports of apples from Canada.

TABLE SHOWING EXPORT OF APPLES FROM CANADA, 1895-1906, INCLUSIVE.

Fiscal Year.	Great Britain.	United States.	Other Countries.	Total.	Total Value.	Year Crop Grown.
	Brls.	Brls.	Brls.	Brls.	\$	
1895.....	751,232	86,841	15,195	853,268	1,821,463	1894
1896.....	504,680	54,062	8,440	567,182	1,416,470	1895
1897.....	1,579,272	54,348	30,850	1,664,470	2,502,968	1896
1898.....	418,181	7,933	17,304	439,418	1,306,681	1897
1899.....	972,125	81,204	21,379	1,075,068	2,621,352	1898
1900.....	896,935	29,529	29,994	956,458	2,578,233	1899
1901.....	643,945	12,502	22,204	678,651	1,482,927	1900
1902.....	490,338	17,162	8,715	516,215	1,566,808	1901
1903.....	973,805	6,064	20,659	1,000,528	2,758,724	1902
1904.....	1,513,744	14,899	69,971	1,598,614	4,590,793	1903
1905.....	986,222	16,784	34,142	1,037,148	2,627,467	1904
1906.....	1,029,418	44,051	144,095	1,217,564	4,083,482	1905

By Mr. Wright (Renfrew):

Q. Are those the statistics for the whole country ?

A. These are the statistics of the apple exports from Canada alone to Great Britain and to the United States, other countries being lumped. We export but a comparatively small quantity to other countries, although we did export of the product of 1905 to twenty-one different countries, as follows :—

TABLE SHOWING EXPORTS, TO COUNTRIES FOLLOWING, IN 1906.

Countries		APPLES, GREEN OR RIPE.	
		Quantity.	Value.
	Brls.	\$	
Great Britain	1,029,418	3,475,825	
Australia.....	156	1,176	
Bermuda.....	1,066	2,987	
British Africa	6,769	22,534	
British Guiana.....	34	102	
British West Indies.....	118	368	
Fiji.....	26	214	
Hong Kong.....	7	35	
Newfoundland.....	11,095	32,690	
New Zealand.....	73	455	
Belgium.....	110	289	
China.....	23	120	
Cuba.....	767	3,114	
Denmark.....	772	2,241	
France.....	55,862	209,131	
Germany.....	63,221	197,001	
Holland.....	3,473	10,359	
Mexico.....	204	774	
St. Pierre.....	169	476	
Norway.....	150	600	
United States	44,051	122,991	
Total.....	1,217,564	4,083,482	

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While, therefore, the bulk of our fruit goes to Great Britain, nevertheless there is the germ of a wide export trade in the other twenty countries with whom we do business in apples.

EARLY APPLES.

It has been commonly assumed, since we have to compete in early apples with the fruit-growers of Great Britain, that if the growers there have a full crop, we cannot expect a large export trade. The following are the statistics of the apple exports from Canada to Great Britain by periods from 1901 to 1906-7, inclusive :—

EXPORT OF APPLES TO GREAT BRITAIN BY THREE AND SIX MONTH PERIODS, 1901-1907.

Year.	From July 1 to Sept. 30.	Per cent of Total Trade.	From Oct. 1 to Dec. 31.	Per cent of Total Trade.	From Jan. 1 to June 30.	Per cent of Total Trade.	Total for Year.
1901-2.....	14,909	2·9	302,045	58·5	199,440	38·6	516,394
1902-3.....	26,953	2·69	690,037	68·96	283,575	28·35	1,000,565
1903-4.....	61,507	3·85	1,053,293	65·9	483,861	30·25	1,598,661
1904-5.....	46,310	4·46	653,504	62·97	337,999	32·57	1,037,813
1905-6.....	16,707	1·37	912,331	74·93	288,567	23·7	1,217,605
1906-7.....	8,676	617,991

You will notice that the first period takes in the very earliest apples we have. In 1901 the percentage of the trade, during those months, to the whole trade, was about 3½ per cent. In 1902-03 it increased to nearly double as many barrels, but did not approach 3 per cent. In 1903-04 it approached to 4½ per cent of the total trade and more than doubled the number of barrels of the preceding year. During the season 1904-05 the percentage to the total trade was nearly 4½ per cent. In 1905-06 it fell to less than 2 per cent of the whole trade, and this season we exported only 8,676 barrels.

I bring this subject to your attention for the purpose of pointing out what I consider the causes for this decrease in the early apple trade compared with former years. We had every reason to expect that the fruit-growers of Canada would take advantage in increased numbers of the excellent transportation facilities fostered by the Department of Agriculture, so as to raise the percentage of that early apple trade to over 4 per cent of the total trade. Why did our exports drop this year to 8,676 barrels? Several causes contributed to the result. The fruit exporters were governed by the fruit crop reports and by the traditions of the past, to such an extent that they could not bring themselves to prepare for a business that their early experience had led them to believe was not profitable. The crop in Europe for 1902-03 and 1904-05 was below the average but the crop of 1906 was good. Consequently, there was no preparation made by Canadian exporters for this apple trade, although subsequent events showed that the prices in Great Britain were excellent for our early apples. You will notice that we sent in 1906, 8,676 barrels to the end of September.

By Mr. Lewis :

Q. All to England?

A. Practically all to England.

By Mr. Armstrong :

Q. You are speaking now of the export trade?

A. Of the export trade alone.

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By Mr. Lewis :

Q. Are there any others sent to the twenty countries that you spoke of ?

A. Very few of them took any of our early apples, I can say practically none.

EXPORTATION AFFECTED BY HOME CONSUMPTION

By Mr. Telford :

Q. Would one reason not be that there was an enormous quantity of early apples sent out to the Northwest ?

A. Yes. But the main reason, I believe, was want of confidence in the British market. The second reason was the one pointed out by Mr. Telford, the large quantity sent to the Northwest market, which is one of the markets that I wish to speak of. We have two principal long distance markets, Great Britain and the Northwest. The latter has furnished an outlet for a much larger proportion this year than ever before in the early apple trade.

By Mr. Armstrong :

Q. What is the reason for want of confidence in the British market ?

A. It is simply that peculiarity of human nature that cannot readily accommodate itself to new conditions. It is a profitable business, as the business of the last four years demonstrates, but the old apple operators, who still control a large share of the business, are handicapped by the traditions of the past. They do not appreciate that there is money in the early apple trade, that it is not hazardous to ship early apples. There is a feeling prevalent, notwithstanding the experience of the last four or five years, that our transportation facilities are defective on trans-Atlantic ships. That feeling, which we have great difficulty in combating, has led to this loss, for such I claim it is, in the trade with Great Britain in early apples.

Q. Just a moment on that. As I understand it, the transportation facilities in crossing the Atlantic have been sufficient to enable eastern shippers to ship early apples, yet many of them have met with serious losses ?

A. That is the point I wish to explain. As far as the steamships are concerned, shippers can do now what they could not do in the early days of the trade. They can ship with confidence to Great Britain this early and tender fruit and be reasonably sure that if the fruit is properly cared for till it gets on board the steamship, it will reach the markets on the other side in safety.

By Mr. Lator :

Q. Was there less confidence in 1906 than in 1905 ?

A. There was less confidence in this way : that in 1904 the crop reports from Great Britain and Europe generally showed a very poor crop and the shippers here said, 'As there is a short crop on the other side we can ship with confidence of a good market.' But last year the fruit crop reports, as you will remember, indicated that there would be a full crop, as there certainly was in the European countries including England. Exporters did not believe we could compete with a full European crop ; nor have the shippers full confidence in the transportation facilities.

TRANSPORTATION AND IMPROVED FACILITIES ON BOARD STEAMSHIPS.

By Mr. Armstrong :

Q. Just a moment. If the transportation facilities on steamships were so much better in 1906 than in 1905, why the decrease in export ?

A. The improvement has been fairly regular and constant for the past six or seven years. I might say that confidence was not established in 1904, except among a few, although there were large shipments in that year. The confidence was in the short crop in Europe. That is what influenced the Canadian shippers, not their confidence in the steamship facilities.

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Q. I want to get definitely in my mind what you are aiming at. I would like to have some knowledge, if you are able to impart it to us, of the improvements in the transportation facilities on the steamships ?

A. The question is quite pertinent right here. In the last six or seven years there has been established on board the steamships a system of cool air and cold storage chambers of which Mr. Ruddick gave you some account in his evidence last week. In that evidence you will find a full statement of the equipment of each steamship. That system was established primarily, no doubt, for the dairy interest but it worked in exactly with other interests, including the fruit industry. These facilities have improved during the last five, six or seven years, since cold chambers were introduced, to such an extent that now—and this is the point I want to emphasize and have you and the whole country know—a shipper can with confidence put his fruit on board ship, and be reasonably sure that it will reach the market in perfect safety if he has put it on board the steamer in proper condition.

By Mr. Smith (Wentworth):

Q. Why do you say that ?

A. On account of the experience we have had during the last few years in watching the fruit as it goes on shipboard at Montreal, and getting reports back from our cargo inspectors in Great Britain on the same fruit.

By Mr. Armstrong :

Q. What guarantee has the government that such is the case ?

A. They have the reports of the cargo inspectors on the other side, the reports of the buyers—the auctioneers and fruit brokers—who are always in communication with the Department of Agriculture.

By Mr. Smith (Wentworth):

Q. Would not a better test be, to know that the temperatures were the proper temperatures for the carrying of fruits ?

A. The temperature after all is the chief consideration and that is an additional reason why we are so confident that the conditions are right. As you are aware, thermographs are placed in all the cold storage chambers and any man who looks at these thermograph records as we get them—steamer by steamer just as they are automatically recorded—can see that we have a most excellent steamship service for the transportation of our apple crop.

By Mr. Armstrong :

Q. I am afraid if you had examined a great many of those records as carefully as I had you would come to a different conclusion ?

A. You will have to remember that these records need to be read with discrimination and with a knowledge of the previous history of the apples. I see the point you are aiming at. Some of the records show the temperature, for some days at least, as high as 50 or 60 per cent though the ideal temperature is not above 35 per cent.

Q. Yes.

A. That is easily explained.

By Mr. Smith (Wentworth):

Q. Excuse me, do not say 60 but say 38, for instance. It never got below 38 on one record. How do you explain that ? Is that a proper temperature ?

A. Thirty-eight would not be a bad temperature. I would not be at all afraid to ship in 38.

Q. Why not 32 or 33 ?

A. That would be a fair subject of inquiry, certainly, if a record of that kind came in. But supposing any steamship went across the ocean with a temperature of not less than 38 I would still say to those in the apple trade 'Ship with perfect confidence ;

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a temperature of 38 will carry your fruit if you put it on board all right.' However, I wish to explain this perfectly proper question as to why some records show a higher temperature than 33. We have four fruit inspectors at Montreal during the shipping season, and their reports show that very frequently the fruit coming during the warm days in September and October is at a much higher temperature in the barrel than the outside temperature. We ask the inspectors to take the records of the barrels of fruit they examine; they open up the head of the barrel without disturbing it more than is absolutely necessary, insert the thermometer well into the apples so that the instrument shall be under the influence of the apples only, and then cover it up again. They thus take the temperature of the interior of the barrel or box; and it has been found on numerous occasions that while the outside temperature would not probably be more than 65, or it may be 60, the temperature of the apples would be anywhere from 70 to 85. In one case it was as high as 85.

Q. You are speaking of cold storage now?

A. Of the apples intended for cold chambers on shipboard?

Q. That go into cold storage on board ship?

A. In most cases at that early season they were for cold storage.

Q. In barrels?

A. In some cases.

By Mr. Armstrong:

Q. Not from iced cars at these high temperatures?

A. Not in iced cars except in a few cases. In some cases the fruit in refrigerator cars showed a high temperature as the result of insufficient icing or insufficient cooling of the fruit before shipment or both.

Q. What temperature was the highest temperature?

A. I cannot say exactly what was the highest temperature of fruit coming in iced cars without consulting the records. The high temperature that I mentioned a moment ago, 85 per cent, was not in an iced car.

BOXES VERSUS BARRELS FOR PACKING APPLES.

By Mr. Smith (Wentworth):

Q. Do not nearly all the apples that go into cold storage come in iced cars?

A. A large proportion.

Q. And do they not mostly come in boxes, not barrels?

A. I am sorry to say our shippers do not yet appreciate the box as they should. I think perhaps more than 60 per cent of the early apple trade is still in barrels.

Q. Without ventilating the barrels?

A. Without ventilating the barrels, a very grave mistake as I think you will agree. In some cases where the apples are at a high temperature they go into the cold storage room. You will readily understand that the cold storage room on board ship is not for the purpose of cooling hot fruit. Space is too expensive to use it for that purpose. Its proper use is to *keep cooled fruit cold*. So that if the fruit goes to the quay at Montreal at a temperature of 75 or 80 it is not in proper condition to go into the cold storage chamber, and I think it would only be fair to the good shippers if there was some regulation by which such fruit would be prevented from going into the ordinary cold storage room. Because shippers should learn, and I wish to emphasize this point, that they must prepare their fruit by cooling it before shipping, by seeing that it is placed in proper refrigerator cars, and kept in a proper condition by any other means at their command, so that it may reach the steamship at a temperature is low as can be secured in a refrigerator car.

By Mr. Lewis:

Q. You refer to boxes and barrels?

A. Yes.

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Q. There is no question that the boxes are preferable to the barrels ?

A. Boxes are altogether better for the early apple trade. Indeed they are almost essential.

By Mr. Chisholm (Huron):

Q. How much longer does it take to cool a barrel of apples than a box ?

A. From experiments made in United States—we have conducted no experiments ourselves—it takes nearly one week to cool the centre of a barrel of apples from 75 to 33, in a temperature of 33 degrees in the cold storage room. You can do the same with a box in about two days or less.

By Mr. Telford :

Q. Is that with the barrel headed up without ventilation ?

A. Yes.

By Mr. Smith (Wentworth):

Q. It will depend altogether upon the power of the cold storage machinery ?

A. The outside air was supposed to have been at 33 degrees all the time.

By Mr. Chisholm (Huron):

Q. The barrel took a week and the box only two days ?

A. Yes.

By Mr. Smith (Wentworth):

Q. Were these experiments made just for the purpose of comparison between the box and the barrel ?

A. Partly that, and partly for the reason that there had been no experiments up to that time to definitely solve the particular problem of how long it would take to cool the interior of a package of hot fruit.

By Mr. Armstrong :

Q. Do I understand you correctly, that apples that are shipped in refrigerator cars and those that are shipped on the ordinary cars reach Montreal and are placed in cold storage chambers under practically the same conditions ?

A. No distinction is made. One man ships fruit cared for in the best possible way reaching the quay at a temperature of 45. It is placed in a cold storage chamber during the voyage to Liverpool. Another man takes his fruit through in an ordinary car, and it may reach Montreal at a temperature of 75 or higher and it will be placed, if so directed, in the cold storage room, side by side with the fruit which has been properly taken care of.

By Mr. Derbyshire:

Q. And both be injured ?

A. The fruit that is in bad condition will injure the other fruit because it raises the temperature of the cold storage chamber.

By Mr. Smith (Wentworth):

Q. You mentioned that the shipper should have the apples delivered at the ship's side at the proper temperature, as nearly as possible that wanted in the cold storage chamber, say 35. How is he going to do that when there is no refrigerator car in the world which will reduce the temperature to anything like that ?

A. I do not wish to leave the impression that fruit can be delivered from a car at the ideal temperature. It would be sufficient if we could get it at the lowest temperature that is possible in the best refrigerator cars we have.

Q. That is from about 45 to 50 degrees ?

A. I think we can get it to 45 degrees possibly.

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Q. You suggest that a shipper should cool the fruit and then ship on the refrigerator car. I agree with you as to the refrigerator car but not to the cooling before shipping, which would probably take 48 hours in a cold storage compartment. This is just so much time wasted. The ship ought to be supplied with such refrigerating machinery that it could do that and save two days' time which is everything in the life of perishable fruit. If the ship's machinery is not sufficient for that purpose then it ought to be provided?

A. We must take an economic view of this matter. If the shippers of fruit insist upon using the steamship chamber for a cooling room, it will take more space for the carrying of the fruit than is needed now and shippers will have to pay a higher freight rate. Are you willing to do that?

Q. I do not think the increased space necessary?

A. I know of no other practical way than to separate the packages and lessen the quantity of fruit in the chamber. To place the packages close together and lower the temperature of the room would mean that the outside fruit would be frozen while the middle packages would be still warm.

Q. We are paying 60 per cent now on the ordinary fruit rate for this cold storage service, which is several times over what you would have to pay on land?

A. I hope you can impress that upon the steamship people.

Q. The ordinary charge for a barrel of apples is one and sixpence. For cold storage we pay two and sixpence?

COOLING OF APPLES BEFORE PLACING ON BOARD SHIP.

A. Granting the exorbitant cold storage rate, the point I want to make is this: that there are two possible methods of cooling the apples properly, one, cooling on board ship, the other cooling them before they leave the shipping station. The latter is the only practical method, because it is cheaper and more important still, it does the work at the right time. Space in a refrigerator car or a steamship cold storage chamber costs many times as much as the same space in an ordinary cold storage building. It is expensive to use this space on car or steamer. It is therefore economy to use the cheap space in cold storage buildings to cool the fruit, and then we can utilize all the space on car and ship for carrying the fruit. I prefer cooling before shipping, for the more important reason, that we can cool it at the ideal time, which is as soon as it is picked. We may lose a day at the beginning of the trip, but we add perhaps a week to the life of the fruit at the other end of the journey. Fruit that is allowed to pass even a few days before being cooled cannot be restored to good condition, no matter what treatment is given it. In New York state, cold storage managers refuse to take the responsibility for apples picked more than 24 hours before being stored.

Q. Put it in the refrigerator car where it is kept cool?

A. Again, I would point out that the refrigerator car is not a cooling room. You might of course half load the car and increase the bulk of ice or use salt tanks, but this will add greatly to the cost of the service.

By Mr. Armstrong:

Q. But how are you going to get the farmers to cool their apples?

A. This whole matter of early shipments of apples leads right back to the fact that we must have cold storage of some sort at the point of shipment for the best results.

By Mr. Smith (Wentworth):

Q. Do you think that for the farmers it would be practicable?

A. It is practicable to a certain extent for every farmer in the Dominion who can store ice.

Q. Do you think it is at all possible?

A. It is not so impossible as it would at first appear. I do not mean that an expensive system of cold storage is absolutely necessary. You have a most efficient

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cold storage at St. Catharines, have you not? Do you not think there are other points in Southern Ontario, for instance, where it would pay to put in a somewhat expensive plant such as they have at St. Catharines? In other places where there would not be business to justify mechanical refrigeration, a cheaper method might be adopted. I am not an expert on cold storage construction, although I have studied the subject of cold storage in its connection with fruit to the best of my ability. I am firmly of the opinion, from the consideration I have given to the matter, that there is possibly a satisfactory system of ice cooling rooms. Mr. Ruddick, in his capacity of Cold Storage Commissioner, will no doubt advise on this subject. Such a system will make it possible for groups of farmers to have cold storage available for the products of their orchards.

Q. You know we had one at Grimsby?

A. Yes.

A. And much of this tender fruit that we experimented with a few years ago went through and arrived in a rotten condition?

A. Perfectly true: but I am prepared to say that the fruit did not go into cold storage in proper condition and was not properly taken care of when it was there.

Q. It took a certain amount of time to get those fruits in the cold storage chamber to a low temperature. It was then put into a refrigerator car and taken to Montreal. There were two days wasted in the cold storage chamber?

A. Not exactly wasted if the fruits had been properly attended to.

Q. It did not bring them lower than the temperature of the car?

A. Let me put the facts another way. Much of that fruit that went into the cold storage room was totally unfit for the purpose for which it was sent—for shipment to Great Britain. Under no circumstances whatever should it have been allowed to go into any cold storage room. Furthermore the rooms were not always properly taken care of. This vitiated that experiment. In extenuation, let me say these shipments were made years ago when cold storage for fruit was new.

By Mr. Armstrong:

Q. Were the rooms under government control?

A. Those who supplied the fruit and had charge of the cooling room were not government officials.

By Mr. Telford:

Q. How long would it take in a cold storage compartment to reduce fruit to 40°?

A. As individual fruits, not long.

Q. Well, in barrels?

A. It would take a week or longer if the fruit was at a temperature of 75 degrees when packed, but in practice the fruit would be cooled before packing or small ventilated packages would be used.

By Mr. Gordon:

Q. Would it be practicable to have different chambers on board ship for fruit shipped in different temperatures? For example, an extreme temperature for hot fruit, a medium temperature for fruit shipped in a reasonably warm condition and so on?

A. It would be impracticable.

By Mr. Smith (Wentworth):

Q. Would that be necessary?

A. That would not be necessary. If you want to cool fruit rapidly the only way is by ventilation. If you take four boxes of apples packed closely together, as they are packed for cargo where I suppose space is extremely valuable, they cannot be cooled as quickly as if they were spread out in double the space where there would be a free circulation of cold air on all sides.

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By Mr. Gordon:

Q. The secret of success is putting the fruit into cold storage in proper condition and following it up.

A. Yes.

By Mr. Smith (Wentworth):

Q. How do you account for the failure of the shipment of California peaches and plums?

A. By the failure of the California shippers or the railway companies to deliver the fruit in good order at Montreal.

Q. It came out of refrigerator cars and nothing else?

A. Quite possible.

Q. Do you mean to say the California plums were not in good condition?

A. I know of cases where refrigerator cars have arrived in Montreal without ice, in which case they are worse than open box cars. The mere fact that the fruit came in refrigerator cars, without other evidence, is not conclusive.

Q. Nevertheless, the fruit came in boxes and not in barrels, and the temperature was from 38 to 40 degrees?

A. If this can be shown, I quite agree with you that all such cases ought to be investigated, and, where the steamship companies are to blame, they should be proceeded against with the utmost rigour.

By Mr. Armstrong:

Q. How would you begin to proceed against them?

A. It is not for me to open that question. Would you not be likely to get better advice from one whose business it is to study and pronounce upon contracts and agreements?

Q. Taking into consideration prices and the difference in distance what is the best market for native early fruits, the Northwest or England?

A. That is purely a question of individuals. Last year the net returns were just about even. Those shippers who were used to shipping, and had good commercial connections, with Great Britain, probably made as much, if not more money than those who shipped to the Northwest. Those who shipped to the Northwest and had good connections and handled their fruit properly, made a very excellent return indeed. I would mention in this connection the experience of the St. Catharines Cold Storage and Forwarding Company, a fruit company formed on the co-operative plan, which realized very satisfactory returns on shipments to the Northwest.

QUANTITY AND VALUE OF SHIPMENTS FROM MONTREAL.

By Mr. Black:

Q. From memory can you say what is the value of apples shipped from Montreal to the British market?

A. In 1906-7 about 400,000 barrels and 50,000 boxes were shipped from Montreal, valued at about one million and a quarter dollars.

STAGE OF GROWTH FOR PICKING EARLY APPLES.

By Mr. Lewis:

Q. Is not the time that the early fruit is picked an important consideration?

A. Decidedly so, the apple must be picked at the right moment for the best results.

Q. What information can you give us as to that?

Q. I would recommend that the apples be picked, not too green, but just when matured, the maturity being shown by having very nearly but not quite its full colour, the seeds being nearly all brown. That is the nearest mechanical rule that I can give you. But a man getting among the fruit and living with it will soon learn to know

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just the stage at which to pick the early fruit. I might say further that the early fruit requires to be picked at frequent intervals ; you cannot pick early fruit all in one picking as you may winter fruit.

By Mr. Chisholm (Huron):

Q. If we can get mechanical refrigeration on the cars could we not cool the fruit while it would be in transit ?

A. That is a technical question upon which I would not care to express an opinion.

THE WEAK POINT IN TRANSPORTATION.

I can at least make this statement : that the weakest point in the transportation question as regards fruit, is the refrigerator car service. It is only within the last year that there has been any supervision by competent men of fruit upon refrigerator cars from the beginning of the journey to the end. The facts brought to light show that the refrigerator car service is in the hands of men who have never made a study of the special needs of the patrons they are supposed to serve, and who are careless in the performance of routine duties, such as repairing cars, icing them properly and moving them properly at divisional points. It is the weakest link in the transportation chain.

HANDLING OF APPLES ON ARRIVAL IN GREAT BRITAIN.

By Mr. Armstrong :

Q. Who takes care of the fruit when it arrives on the docks in England ?

A. It is taken as quickly as possible to the selling warerooms. There is no cold storage, and I do not know that it is desirable there should be. It goes into the ordinary temperature of the English climate, which, if the apples have been properly handled is perhaps about the best that could be done for them. They are sold immediately and pass into consumption. I would not recommend the holding of this fruit in cold storage rooms on the other side, but it should pass as quickly as possible to the salesroom and to the consumer.

Q. How quickly is it passed ?

A. Usually it is sold the second day, and not often later than the third day. It lands to-day and is sold to-morrow. Sometimes it is even sold on the same day that it arrives, and the third day it is sure to be sold.

By Mr. Chisholm (Huron) :

Q. Another point to be emphasized is that the germ of future trouble is contained in the fruit before it is taken off the tree at all. The farmers do not understand that ?

CANADIAN COMPETITION WITH THE HOME GROWERS OF GREAT BRITAIN.

A. That emphasizes what has been said here, the time of picking should be carefully considered.

Now, Gentlemen, I have emphasized the necessity of taking proper care of this early fruit from the tree to the steamship. I want to emphasize one other point, that is, that we can successfully compete with the English apple-grower on his own ground. I want to make this statement with emphasis, because it is not commonly believed. We all know it can be done in the case of winter apples. I wish to assert that the Canadian grower can compete successfully with the English apple-grower in early apples, and sell side by side with the latter in the markets of Great Britain, and secure a profit.

CHARACTERISTICS OF THE BRITISH HOME GROWERS.

Do not mistake me. I believe that the fruit-growers of Great Britain can be sharply divided into two classes ; what you might call the professional fruit-growers

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and gardeners, who are undoubtedly ahead of any class of the same sort we have in Canada. But the rank and file of the English fruit-growers are not equal to the rank and file of our fruit-growers here. The English growers have too many varieties; they have a dozen where we have one. The average English grower does not understand the treatment of insects and fungous diseases as well as the Canadian growers, and he has more of them to contend with. He does not practice uniformity in grading and packing to the same extent as our fruit-growers. The English land tenure also discourages extensive orchard planting.

By Mr. Lewis :

Q. You spoke of the rank and file, meaning the commercial growers; the other class are not commercial growers?

A. That is so for the most part. They are usually in the employ of gentlemen, but are sometimes employed by extensive commercial growers.

Q. They do not come into competition at all?

A. Except in a few cases when they grow a fancy article which then gets a fancy price.

CANADA'S ADVANTAGES FOR EARLY SHIPMENT OF APPLES.

By Mr. Finlayson :

Q. What apple do you think is the best for early shipment?

A. We have a great advantage on account of the fact that we grow Red Astrachan, Duchess of Oldenburg, Wealthy, Gravenstein, Colbert and Jennettings in large quantities and over a wide area of different climatic conditions.

Let me point out our advantage by using the Duchess of Oldenburg as an example. We can commence to ship this apple from Essex county quite early. I picked it last year on the second day of August, from my own trees, in good condition to ship. Later on, about the middle of August, it can be shipped from north of Lake Ontario; further down the St. Lawrence about the last of August; from the Eastern Townships still later. In the valley of the St. John river, New Brunswick, it is a favourite apple grown in large quantities. It is grown to perfection there, and the keeping quality is much better than in Ontario. They can ship the variety well in barrels until the first of October or later. Thus you see we can ship the Duchess in good condition, and in large quantities, for two months or more. This gains for us the good will of the large brokers, the auction-room man, and the large merchants, when they can get one variety of apple during a long period, packed and graded in the same way or nearly so.

By Mr. Lewis :

Q. The Duchess is a Russian apple, is it not?

A. Yes.

By Mr. Finlayson :

Q. How about Northern Spies?

A. They are splendid winter apples and growing in favour.

By Mr. Sinclair :

Q. Is the Gravenstein falling off in the province of Nova Scotia?

A. It is not being planted as it should be, but I think there will be a revival in the near future when growers learn to top-graft it upon hardy stock. The tree has shown signs of weakness—collar rot and canker. It has made the reputation of the Annapolis Valley, and I believe it will be a favourite with growers again when they learn to overcome the defects of the tree.

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By Mr. Black :

Q. They are dying very rapidly from collar rot ?

A. It is indeed a serious condition of affairs.

The English grower has other disadvantages, in addition to land tenure and burdensome taxation. The transportation difficulties are quite as great as ours. He has foreign competition at all seasons and in all varieties of fruit. There is lack of organization and no active government aid such as we have here ; the labour question is just as serious for them as it is for us, only in a slightly different way ; they have not the same freedom with reference to market privileges that we have ; and they have some difficulties which we have not here at all. For instance, birds are the Canadian orchardists' greatest friends, but several species in England are grievous pests.

By Mr. Sinclair :

Q. Does the agricultural labour demand the same wages in England as in Canada ?

A. No, but relatively the labour difficulties are quite as great there as here.

By Mr. Black :

Q. Is the English sparrow considered destructive to the apple crops ?

A. Not in Canada.

By Mr. Blain :

Q. How was the crop of apples in Ontario last year ?

A. A little above the average crop on the whole, but below the average in some sections growing the best winter fruit.

The other important market for our early fruit, the Northwest, is growing rapidly, and it is impossible to think of any conditions that will not make it a permanent one for our early fruit. The preparation and care of the fruit for this market does not differ in any respect from that required for the English market, but we are obliged to depend upon land transportation, which, I am sorry to say, is not so satisfactory as the steamship journey. Nevertheless, we have every confidence that the service will improve as the trade becomes larger, if the fruit growers continue to bring pressure to bear upon the transportation companies. Even this year Ontario fruit shippers were able to ship tomatoes successfully as far west as Calgary. When such a service can be counted upon to deliver the fruit with perfect regularity and at a reasonable freight rate, it is difficult to believe that the apple growers of Canada will soon overtake the demand for early apples in the Northwest.

ORCHARD BY-PRODUCTS.

May I now direct your attention to some of the orchard by-products. The statistics of Ontario show that there were grown last year in Ontario somewhere in the neighbourhood of 12,000,000 barrels of apples.

By Mr. Armstrong :

Q. Are those the Ontario statistics ?

A. The Ontario statistics ; they are the only provincial statistics available. That is an estimate, remember, that has been made for a number of years, and has been checked once in its details with the Dominion census with which it agreed so well that we can take it as fairly accurate.

UTILIZATION OF ORCHARD BY-PRODUCTS—PRESENT HEAVY LOSS.

We export from the whole Dominion less than a million and a half barrels. Supposing that two millions more go into evaporated apples, jam, jellies, cider and things of that sort, and allowing two or three million barrels more for local consumption, it still leaves five or six million barrels of apples unaccounted for, if these figures are at all correct, and I believe they are.

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By Mr. Black :

Q. Do they not feed a lot of domestic apples ?

A. I think they do. I believe there is a very large quantity of this fruit that is fed to stock. It is worth for that purpose about the same as mangolds or turnips, eight or ten cents a bushel or somewhat less, so that I would consider that practically a waste. A great many are allowed to rot. I merely point out this fact to show that there is ample material here for an enormous trade if we would work up this surplus and low grade fruit into something that is useful. This is the raw material for cider, jams, jellies, evaporated fruits and things of that sort. Let me point out in this connection the relation between evaporated fruits and our green fruits.

From Canada last year there was exported three and a half million pounds of evaporated apples with a value of \$212,000. Now we exported green fruit to the value of over \$4,000,000. Let us turn to the United States. That country in the same year exported of green apples just about the same amount that we did ; but when we come to evaporated stock the United States shipped 27,852,831 pounds of the value of \$2,044,820.

Q. That would not be exclusively apples ?

A. Exclusively apples.

Q. No pears or peaches ?

A. Pears and peaches are excluded. We export nearly as many green apples as they do, but they sell five times as many evaporated apples as we do.

By Mr. Lewis :

Q. Have you any idea how their prices compare with ours ?

A. We can furnish the raw material just as cheaply as they can. We have to compete directly with them in green fruit, and the inference is fair that we could compete with them in furnishing the material for evaporated apples on even terms.

By Mr. Lalor :

Q. Where is the market for this ?

A. The markets are, of course, the countries of Europe, in some of which it is but fair to say we do not have an equal chance.

By Mr. Armstrong :

Q. Why have we not an equal chance ?

A. The fact is that Germany, the largest market for evaporated fruits, is closed against us by a high tariff.

Q. How much does the United States ship to Germany ?

A. About 50 per cent of their evaporated fruit goes to Germany. In 1905, 19 millions out of a total export of 39 million pounds went there.

Q. Is the waste in the apple trade you spoke of, not attributable to the scarcity of farm labour ?

A. That is one cause, but no one cause will account for all.

By Mr. Blain :

Q. Are we to understand that 6,000,000 barrels in the province of Ontario go to waste every year ?

A. Including what is fed to stock.

Q. I heard that statement challenged the other day by a fruit man who said the figures were very much exaggerated ?

Q. I have thought that perhaps there might be a mistake, and for a number of years I have looked very carefully into the figures, and have discussed the question with the official at Toronto who has charge of these statistics, and, after examining his method of estimating, I am bound to say I cannot see where he has made a mistake.

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By Mr. Sinclair :

Q. How does he estimate the whole consumption ?

A. He does not estimate the whole consumption but just the production.

Q. When you speak of barrels going to waste you must estimate the whole consumption ?

Q. That is my estimate. I allowed two or three million barrels out of the whole for local consumption. It is a loose statement, but accurate enough to cover the case.

Q. You allowed a couple of barrels a piece ?

A. I think two barrels to the family would be a fair estimate.

By Mr. Lewis :

Q. Have you any estimate of what is sold to the retailer in Canada for home consumption ?

A. I cannot make it much over three million barrels.

THE MANUFACTURE OF JAMS AND JELLIES.

By Mr. Armstrong :

Q. What is the total production of apples in Canada ?

A. Ontario produced about two-thirds of the apple crop. It is probably about sixteen million barrels, with an average crop. I think that is rather an over estimate than an under estimate. I merely mention this to impress the fact upon you that we have the material for a large trade in the by-products. I do not wish to dwell on the question of jams and jellies further than to say that it struck me as a most curious fact that we are importing from Great Britain \$758,000 worth of jams and jellies.

By Mr. Lewis :

Q. Made out of apples ?

A. No. English jams and jellies are made out of all kinds of fruit, but mostly from plums, strawberries and raspberries.

By Mr. Schell (Oxford):

Q. Are there no apples in that ?

A. Very few that are acknowledged.

Q. They use only fruit we could raise here ?

A. Yes. Nevertheless, we import largely. I noted it in order to show there is room even at home for our by-products.

By Mr. Lewis :

Q. Have you any estimate of the jams and jellies they make in Ontario ?

A. No, I have not. It is very difficult to get statistics on that point.

Q. Are there any factories making jams and jellies that you know of in this country ?

A. Yes, a large number.

Q. Do they pay ?

Q. I have no doubt of it, but there is room for more.

Q. How do they compare with the evaporated apples in returns ?

A. The export trade is not large in jams and jellies. There are four principal items that go to make up the cost of jams and jellies, viz. :

(1) Containers (cans, jars, glasses, &c.)

(2) Sugar.

(3) Labour.

(4) Fruit.

Fruit is really the least important of the four as an economic factor. What is important is the high price of the container, that is the glass, crockeryware, and, I

may add, the tin cans. They can be got so much cheaper in Great Britain than in this country that the makers of jams and jellies in the two countries are hardly on equal terms. Then again sugar and labour are much cheaper in Great Britain. Our manufacturers are heavily handicapped on these items. But as far as the fruit is concerned we have it in abundance, and can compete with any nation on the face of the earth in that.

MANUFACTURE OF CIDER FROM ORCHARD BY-PRODUCT.

The question of cider as an orchard by-product is an extremely interesting one. In France, Germany and in England, people are making and drinking much larger quantities of cider than they ever did before. It is replacing distilled liquors, and to some extent wine. They are exercising more care too in the manufacture of it, and yet cannot make enough to meet the demand. To show that there is a market for cider, I would just like to read to you an extract from a report of the Trade and Commerce Department, one of many that could be cited from different sources.

By Mr. Telford :

Q. What is the date of that report ?

A. This is Report No. 141, October 8, 1905, by the Canadian Commercial Agent at Birmingham, Mr. P. D. Ball. He says :—

‘As the season draws on for cider making I would again call the attention of our cider makers to the large export trade which can be done with this country. In my district only one Canadian firm seems to have thoroughly gone into the matter, and with the exception of a few barrels which became rosey the trade has been a thoroughly satisfactory one, at least so far as the quality of the article and the sale are concerned. Canadian cider has made a good name.

‘I have a number of inquiries for cider and I have from time to time given the names of the people who have written to me desirous of opening up trade. There seems to be a very good opportunity for opening up further business. There must be a large quantity of apples in Canada that would not pay to export, but which are good for cider making.

‘Certain districts in Great Britain are celebrated for their cider, and are going into the manufacture much more scientifically than heretofore, being much assisted by investigations made by agricultural societies (I made a report on this subject, published in the *Weekly Report* of October 20, 1905), but they cannot supply anything like the demand which seems to become greater every year. In talking with cider makers and dealers I find that Great Britain cannot now supply the demand with their own apples, and though the makers have imported from Canada and other countries apples in bulk, this is not a very satisfactory way for several reasons.’

The demand for cider certainly exists, but we are not able to meet that demand although we have the raw material in abundance.

By Mr. Lewis :

Q. Is it not a fact that the Canadian apple is much preferable for cider to the English apple ?

A. I wish I could say so.

Q. It is generally understood so ?

A. Our dessert apples do not produce the high class cider that is made from French and English apples grown especially for that purpose, but our apples make, nevertheless, a most excellent cider.

Q. Are not our varieties stronger and better than theirs for cider purposes ?

A. There are four elements that go to make up a good cider apple, the sugar, the tanning, the mucilage and the acids. What our apples lack is the tannin, that is, the astringent element which would be very objectionable in a dessert apple but important for cider. The apples grown in European countries, specially for cider purposes, have

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that element and also perhaps a certain aroma deficient in our apples, but which are especially required for the manufactory of the best class of cider. Nevertheless, our apples are so good for cider that we need not fear for quality.

By Mr. Sinclair :

Q. Are we exporting any cider now ?

A. Only \$9,000 worth last year. There are only two or three firms exporting in a small way.

By Mr. Black :

Q. What would they want the cider in, in bulk, glass, wood or how ?

A. They would like if possible to get the green fruit, but that has been tried for a number of years and found to be impracticable.

The next best way is cider in bulk. They would like to get the cider manufactured here with the same care that is given to the manufactory of wine. That is what we have got to do if we are going to secure this trade and keep it. We would then have to ship the cider, under certain precautions, in wood, because this cider for the most part would not go directly into consumption. Our cider would be used to blend with the English ciders that were perhaps too pronounced in some features. Our cider being of a different quality, a skilled cider maker would have no difficulty in blending it successfully with the English make. This is not in the nature of an adulteration, it is a question of scientific and systematic blending of two ciders of different characters, the resultant blend being better than either one of the ciders that formed the blend. Blending is also an essential operation, as you know, in the wine trade.

By Mr. Chisholm (Huron):

Q. Do they blend cider with wine in any case ?

A. I have no knowledge that they do.

By Mr. Lewis :

Q. Do they make champagne of our dried apples and send it back to us ?

A. That has been reported, but I have no proof that such is the case. However, I am free to admit this, that I have tasted effervescent cider manufactured wholly from apples and I could not tell it from champagne, but I confess at once that I am far from being an expert in wines, and especially champagne.

By Mr. Pickup :

Q. We are shipping a good deal of evaporated chopped apples. Are these not used in the manufacture of champagne ?

A. I have no reason to believe they go into the manufacture of champagne. I believe that the greater part of the chopped apples exported go to make a cheap grade of cider used by labourers and mechanics in France and to a less extent in Germany. They make of this a cider containing two or three per cent of alcohol that is very popular and is sold cheap to workingmen, who drink it instead of the more expensive domestic high grade cider. French cider, made from special cider apples, is a beverage that is classed with high-priced wine.

By Mr. Armstrong :

Q. A few years ago we used to ship quantities of apple cores and refuse to Germany but that market is practically closed to us now. Is there not a valuable market in Germany for the green apple and its by-products ?

A. Certainly Germany would be a most excellent market for the Canadian apple, evaporated or green.

Q. Can you give us any knowledge of the prices as compared with Britain ?

A. Not further than to say that those who have formed good connections in Ger-

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many consider prices slightly better than in Great Britain, but that may be because it is not so well supplied. Germany took 13,796 barrels of green apples of the crop of 1904 and 63,221 of the crop of 1905.

Q. There would also be a market for cider there, would there not ?

A. Certainly, if we had the proper stock to meet the demand.

By Mr. Pickup :

Q. Do they not ship Belgium apples to London ?

A. Not in large quantities. They grow plums and small fruit more largely.

CIDER MAKING IN CANADA.

We sent out a large number of schedules asking the cider makers for information with reference to their industry. We ascertained that there are at least two hundred people who are manufacturing cider in Canada, but of this number probably not more than five per cent manufacture for other than local use. One correspondent says that the government should experiment with the evaporation of apples and with the making of cider and cider vinegar to use up the varieties that are now going to waste. Another correspondent from Leamington, Ontario, formerly a heavy apple producing district, says, 'Nearly all the apples dropped off the trees from heavy wind storms, and what we sold went for 20 to 40 cents per hundred pounds.' That is an unfortunate state of affairs. Wind storms, fungous diseases, San José scale and other insects and want of labour, have prevented a lot of this material from going as shipping fruit.

By Mr. Chisholm (Huron):

Q. If the apples were plucked or gathered at the right time the wind would not be so liable to do damage ?

A. Even with the best of care, wind storms spring up a few days before the apples should be picked, and the result is very serious. It is very hard to provide against that.

By Mr. Black :

Q. Have you any reports from Nova Scotia as to cider making ?

A. Yes, there is some cider making carried on there but not in large quantities.

Q. What would you call a large quantity ?

A. Quantities sufficient to justify looking for long distance customers. The question was put in this way: What proportion of your cider do you sell—

(1) Locally ?

(2) To other Canadian markets ?

(3) For export ?

In all cases but one, in Nova Scotia, they sold simply locally. Many said they manufactured only for customers who brought their apples to them.

By Mr. Pickup :

Q. Can those apples be grown here that make the fine English cider ?

A. We can grow them to perfection but we can make more money by growing and shipping good cooking and dessert apples.

Q. The same fruit can be grown here just as well ?

A. Perhaps better.

By Mr. Armstrong :

Q. Can good cider be made of our waste apples ?

A. An apple may be small, off colour, affected with scab or ink spot, have the skin slightly bruised or even broken, be slightly frosted and overripe for shipping and yet make good cider. Such apples could not be placed on the market at all and yet properly handled, yield a return only slightly less than shipping grades. Three qualities the cider apple must have :

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- (1) It must be clean.
- (2) It must not be affected with rots or moulds.
- (3) It must be ripe.

Q. At what price per gallon is cider sold ?

A. The average was from eight to twelve cents per gallon, as it came from the press.

Q. What is the price they would receive in England ?

A. The \$9,000 worth that we shipped had an export value of about sixteen cents per gallon.

By Mr. Lewis :

Q. With cider at eight cents per gallon in Canada, and fruit for evaporating at from 35 to 40 cents per hundred pounds, which would pay the grower the better ?

A. I think the evaporated fruit would pay better, but we could get more than the figure I have mentioned for well-made cider. That is only the price paid for a raw article ; it is not a finished product. Besides, the cider industry, if once properly established, would not fluctuate in price as much as evaporated apples, and would also make use of a certain grade of stock to more advantage than in any other way.

By Mr. Black :

Q. Could the remaining apple pomace be made into denatured alcohol ?

A. Yes. The pomace after the first run is take noff could be fermented again, and would yield alcohol in paying quantities. In all probability it would be even more profitable to turn it into vinegar.

CARE AND SKILL NECESSARY IN CIDER MANUFACTURE.

I sincerely trust that I have not left the impression that cider making is a simple process that can be taken up by every farmer who has a few waste apples. Such is not the case. To make cider such as could be exported with profit or recommended for domestic use demands even greater care and skill than the making of butter and cheese. Indeed, the object I have in view, in bringing this subject before you in some detail, is to impress the need of some special instruction and demonstration in cider making before we can hope to have even the beginning of a cider trade. It will require some such propaganda as is supported in the various provinces for the improvement of dairy products (together with what help can be judiciously given by the Dominion government) to put cider making on a commercial basis. But once established, I have no doubt whatever about the important place it would take in our exports. France, Germany and England have increasing demands for cider which they cannot meet. It is true that the United States is catering to a slight extent to the trade, but we are even more favourably situated than the American growers for this trade (except in the matter of freight rates), and can win out, if we proceed intelligently to put cider making on a proper basis.

UNFERMENTED APPLE JUICE.

May I point out, just here, that there is a keen home demand for unfermented apple juice, that could be met with little difficulty by apple growers, if they knew how simple the process is. To press out the juice, filter, pasteurize and bottle requires only a very modest plant, with an investment not beyond any small group of growers. I am sorry to say that some brands of this now on the market in Canada are adulterated by the use of preservatives. Preservatives are quite unnecessary, and can be detected in a general way by exposing a quantity of it to the air at the ordinary temperature of the living room. If it ferments within two or three days in all probability no preservative has been used ; if it remains sound for four or five days or longer, preservatives may be suspected, and a specimen should be sent to a chemist for analysis before such brands are used in large quantities.

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CO-OPERATION IN THE UTILIZATION OF ORCHARD BY-PRODUCTS.

Turning now to another subject, permit me to say that before we can utilize these waste products—for cider making, canning or jelly making—we will have to secure two things among our fruit-growers : first, a broader education, a diffusion of more knowledge of fruit-growing. Few of our Canadian apple-growers are well posted in fruit-growing ; they are farmers with apple growing as a side line. We would like to see more educational work done to still further improve the returns from this most remunerative branch of mixed farming. Second, we want organization. This is where co-operation comes in.

By Mr. Pickup :

Q. Organization in the selling of products ?

A. Yes, and where possible in other features. I am pleased to report in this connection that we have now about 35 co-operative associations that are doing good work throughout Canada. There are 25 of these associations in Ontario doing excellent work, so that the co-operative movement has now a secure hold, after some years of preliminary work by a number of public spirited men who are interested in the subject. There is likely to be a very large increase in the number of societies in the next few years. These societies secure for themselves many benefits. I am not going to enlarge upon these further than to draw your attention to the more important, as follows :—

(1) Uniformity of packing and grading.

It would be impossible to do a profitable trade with Great Britain in early apples without this. Co-operation is the only method that will place large quantities of the same variety uniformly packed and graded on the market in one line.

(2) The adoption of the most economical method of picking and packing.

The itinerant buyer cannot afford to handle early apples. He cannot pick all at one visit and it is too expensive to move his gangs frequently from orchard to orchard. Again, his methods are too slow to meet the needs of the early apple. It must be moved promptly and with care. This the ordinary apple buyer cannot do. Hence, I look for no great increase in the early apple trade except among the larger growers and co-operative associations.

(3) To secure the picking, packing and shipping of each apple at its best.

The conditions noted in the last paragraph operate in the case of varieties. The early apples come on so rapidly that frequent picking is a necessity.

(4) The manufacture or wholesale purchase of packages such as barrels, baskets and boxes.

The reputation of the itinerant apple buyer is not good with the coopers. These buyers usually have no security that can be attached nor do they manage their business so that the number of barrels they will need can be calculated. The result is that coopers, as a rule, will not make barrels without definite orders and a deposit, and this the buyers will not give till their purchases are sure, usually late in the season, the price, therefore, is high and the supply by no means sure.

Co-operative associations are able early in the season to calculate their probable needs and even if they over-estimate, the consequence is not serious, as they can store conveniently and safely which cannot be done by the ordinary buyer. Many of the associations make their own barrels, and are thus able to lower the price and furnish work in winter for men skilled in summer work. In one instance, this year, outside growers and buyers were paying 40 cents for barrels ; the same quality cost the co-operative association 28 cents. Presuming that there are four million apple barrels used each year in Canada, this difference would represent the very respectable sum of \$480,000. It is quite certain that at least half this sum is wasted every year on apple packages for want of proper organization.

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(5) The placing of the purely commercial part of the industry in the hands of competent men whose interests are directly coincident with those of the other members of the association.

ORGANIZATION OF CO-OPERATIVE ASSOCIATIONS.

That is to say 60 members unite, as in the association at Forest, and they place the selling of their fruit practically in the hands of a manager, a gentleman who has had some experience in commercial affairs, and is perhaps above the average farmer in his ability to make sales. He, with the co-operation of course of those who can help him, undertakes to sell the fruit of the whole 60 members, so that even the poorest of the members in point of commercial enterprise has the advantage of the best commercial head there is among the whole number. You see the advantage of this. I need not point out that many items of expense in selling are only slightly more for the whole 60 members than for one or two of them.

(6) To stimulate to the greatest possible degree interest in the improvement of the industry among the less progressive fruit-growers.

The only sure foundation for any permanent industry is the excellence of the product. Under the present system of apple selling there is no personal and individual pressure brought to bear upon the less progressive growers, to stimulate them to better work. The itinerant buyer has no motive, as he is never sure of buying the same orchard twice. The more progressive grower has no great incentive, as the poor quality of a neighbour's orchard has only a remote effect on his product. But all this is changed under the co-operative method. The manager's reputation and the reputation of the association is affected by the poorer product. Hence every member of the association, as well as the manager, is financially interested in having the products of every member's orchard of the very best quality. The less progressive growers thus have the active aid of the best growers, and are instructed and stimulated to do much better work than they otherwise would do.

* (7) To promote the sale of fruit at the point of shipment.

The St. Catharines Cold Storage and Forwarding Company, in 1906, sold 463 cars of fruit, distributed to various points in the Northwest, Manitoba and the provinces of Ontario and Quebec, nearly all of which were sold before leaving the point of shipment. This would have been impossible if the growers sold individually.

(8) The utilization of surplus and non-shipping grades of fruit.

The fact that this surplus can be easily and regularly accumulated from year to year simplifies the problem of evaporators, cider presses, jam and jelly making. Not only will there be a profit from these by-products but there will be a tendency to improve greatly the shipping grades of fruit. There is little temptation to ship poor grades of green fruit when these lower grades can be turned into good grades of preserved fruit at a fair profit.

I have said enough I think to convince you that it is of the utmost importance to organize the apple-growers in co-operative associations. The effect will be far reaching. Co-operation is needed in other farm industries as well as in apple growing, yet the need is perhaps more evident to the average man in this industry than in others. If then, we can promote co-operation in this line successfully we pave the way for co-operation in other lines. We may thus gradually break down that extreme individualistic sentiment so prevalent among farmers and so detrimental to the co-operative movement and the farmers' best interests.

In closing, permit me to say that I believe this question of orcharding is one that will appeal alike to the economist and to the patriot, if they are not one. Upon the purely money side, it can be confidently asserted that no branch of mixed farming is to-day paying better, or supplements more fully other lines of work. This, however, is not its highest recommendation. The student of social problems will find in orchard-

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ing and horticultural pursuits generally, a partial relief at least from some of the gravest disabilities under which modern society is labouring. Looking towards the cities and manufacturing centres, he is confronted with the awful horrors of the tenement houses and the slums ; looking towards the cattle ranches and large grain farms of the west he sees an isolation scarcely less to be dreaded. In fruit-growing we strike the happy medium. I hope to see the time when there will be ten acres of orchard on every farm in the fruit-growing belt. This will mean for every such orchard an additional family, happily located with congenial and healthful employment, where they can breathe pure air and enjoy the blessing of sunshine.

By Mr. Black :

Q. Do you mean that a ten-acre orchard is sufficient to maintain a family ?

A. Just so. If I were to plant a ten-acre orchard, with all the incidents that go with it, I would consider a house to accommodate a man and his family a necessary adjunct to that orchard.

Q. I am sure that you are right.

A. It is in surroundings such as these, where there is the greatest possible diversity of wholesome labour of head and hand to develop and train every power and faculty of body and mind that we must look for the cradle of the race to whom we would willingly consign the destinies of Canada. I, therefore, most earnestly commend this industry to your careful consideration for its social advantages in nation-building as well as for its economic value.

Having examined the preceding transcript of my evidence, I find it correct.

A. McNEILL,

Chief of Fruit Division, Department of Agriculture.

ORCHARD PESTS, INSECTICIDES, FARM WEEDS.

HOUSE OF COMMONS,

COMMITTEE ROOM 34,

WEDNESDAY, March 6, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 10.30 o'clock, Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—We have with us to-day Dr. James Fletcher, Entomologist and Botanist of the Dominion Experimental Farms, who will speak upon 'Insects Injurious to crops in 1906, including the San José Scale in particular, and Weeds of the Farm.' I have much pleasure in introducing Dr. Fletcher.

Dr. FLETCHER.—Mr. Chairman and Gentlemen,—I am very much pleased to have the opportunity of meeting this Committee again. Last year I had to leave for the Northwest just at the time when your meetings were taking place, as I had to take part in the work of the Weed Seed Special train, a very important work which, I think, has had useful results in that great country, not so much perhaps, as we told the farmers at the time, in teaching them anything new, as in reminding them just at the time when some of the knowledge which they already possessed had best be put in force. As an instance, the methods of treatment of grain for the prevention of Smut are well known there and have been very useful in the past, but probably for a year or two had not been practised sufficiently. By reminding farmers just at the time when the work ought to be done, more progress has been made in the general adoption of the proper treatment for smut than has ever been the case before. It might naturally have been expected that there would have been more smut last season than even the year before on account of the heavy infestation of 1905; on the other hand, there was a decided improvement; and this can be attributed, I think, to the much more universal treatment of seed grain before sowing, with the recommended remedies. There was a good deal of smut, undoubtedly, but not nearly as much as there would have been, had it not been for the treatment of the seed with the usual solutions of formalin or blue-stone. The question of farm weeds was also discussed very thoroughly on this expedition. The characteristics of the most injurious kinds of weeds were explained, and attention was drawn to the methods which had been useful in subduing them in other parts of the country and in parts of the United States where the conditions were the same.

WORK OF THE YEAR.

The work at the Experimental Farm during the past season, in the Division of Entomology and Botany, has been very much of the same nature as in previous years, the chief aim being to keep in touch with observant correspondents in different parts of the country, so as to know when outbreaks of injurious insects occurred, and, as soon as possible, to advise farmers and fruit-growers as to what are the best steps to take to prevent loss. The annual reports of the Experimental Farms and the reports of this committee have been of very great use in this work in the past, because of their wide distribution, and, although even at the present time, a great many of our people do not make the use of these sources of information which they might, still the enor-

mous number of copies which are distributed every year and the copious extracts which are reprinted by the daily and weekly newspapers, bring the useful results of experiments before the notice of many who are certainly benefited by getting this information. There are remedies for nearly all of the injurious insects : but those which are the most successful, are the simple practical remedies which do the work, the preparation and the application of which are simple enough to prevent mistakes being made, and the cost of which is such that it pays to adopt them.

THE SAN JOSÉ SCALE.

During the past year there have been few important outbreaks by injurious insects. Special reference, however, must be made to the San José Scale. Its ravages in Ontario have created the impression that it is more widespread through the Dominion than perhaps is actually the case. At any rate, owing to the general interest in the subject and from the fact that it was recently discussed in parliament, it seems expedient to mention that insect particularly. It may first be stated that no injurious insect so far studied has caused such extensive losses in fruit orchards. There is no one insect, perhaps, with regard to which there is such a voluminous literature as the San José Scale. This is due to the enormous injury that in a very short time is apparent in orchards where it has been introduced. It is an exceedingly small insect and very difficult to see. One of the chief difficulties in getting owners of fruit trees to treat their orchards has been the inconspicuous nature of the scale. A tree may be thoroughly infested, in fact coated with these scales, millions of them, and yet people who had not had their attention drawn to the fact, would overlook them entirely. This piece of branch which I submit for your inspection, is so thoroughly coated with scales that you cannot see the bark itself at all.

LIFE-HISTORY OF THE SCALE.

This insect increases with incredible rapidity. It has been found by careful observations that a single female which has passed the winter half-grown will about the 1st of July begin to bear young, and may before the end of the season have produced 3,216 millions of descendants. These, of course, consist of both males and females, and, although the male lives for a much shorter time than the female, both do harm, their attacks having a very injurious effect on the bark, wood and general vitality of the tree. The life history is briefly as follows :—The winter is passed by the partially grown insects beneath their scales. When warm weather comes, they revive and grow quickly, the males reaching maturity a few days before the females. These are extremely small two-winged flies and, strange to say, when fully developed have no mouths, so take no food. After pairing with the females they soon die. The females begin to give birth to living young towards the end of June, and the minute dust-like young may be found moving about on the bark from that time till November. The adult female bears her young alive and active instead of laying eggs like most other scale insects. In ordinary cases, as with the oyster-shell scale, eggs are laid beneath the mother scale. These in due time hatch, the time required being longer or shorter with different species. The young six-legged larvæ crawl out on to different parts of the plant, seeking a suitable place to fix themselves for life. But, in the case of the San José scale, no eggs are ever laid ; the females produce living young day and night at the rate of about a dozen every 24 hours, and this is kept up for nearly six weeks before the exhausted female dies. The microscopic young are pale yellow in colour, with oval bodies, six legs and two feelers. The long thread-like beak, with which a scale insect sucks the sap of the plant and fixes itself to the bark, is at first doubled up in a groove of the body wall. After crawling about for a few hours, the larva works its beak through the bark into the sappy layer below and remains fixed, if a female, for life, and if a male, until it is fully developed, when it will have wings and a few more hours of active life.

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The waxy shield or scale begins to be formed even before the young scale insect becomes fixed. It is secreted from the body, and in about two days the insect is entirely concealed by this covering, which has characteristic markings. The male insects take about 26 days to mature, and the females two or three days longer; then, from the time of birth of a young female until it develops into a mature young-bearing mother, only 40 days are required. The enormous fecundity of these females has already been alluded to, and the effect of the attacks of these insects upon the trees they infest, seems to be of a disproportionately serious nature to the small amount of sap they suck from the tissues, which become purple and discoloured. Healthy growing trees, when once infested, soon lose vigour and in three or four years sometimes are injured beyond recovery.

EXTENSIVE INJURIES.

When discussing this insect before this committee ten years ago, I exhibited a photograph of three large peach orchards in Maryland, which abutted and stood close together, consisting of 28,000 bearing trees. These were so badly injured in three years from the time the scale first appeared, that half of them were dead and had to be cut down. The following year the whole of these trees were dead and were destroyed. This gives some idea of the immense losses which may result from the attacks of the San José scale, though each individual is so minute. I suppose \$10 would be a fair amount at which to value a full-grown bearing peach tree, so that \$280,000 would be the loss for the trees alone in these orchards.

Since that time great changes have taken place in the distribution of this insect.

NOT A NATIVE OF AMERICA.

Although called the San José Scale first in 1873, from the name of the place in which it was first noticed in California in 1870, this is not a native American insect. In the ten years which elapsed from its introduction into America until it was described in 1880 by Professor Comstock, who was at that time United States Entomologist, it had done so much harm that it was called distinctively the Pernicious scale. By the end of another ten years, in 1890, it had spread throughout California and up through Washington and Oregon. In 1893 it was found in the Eastern States, and in four years it had spread through nearly all the fruit-growing states of the Union.

Although called after San José, in California, and at one time so destructive in California, as a matter of fact, the state of California to-day is perhaps as free from injuries by this insect as any other fruit-growing state in the Union. The exact reason for this is not quite known; but it is generally stated that this favourable state of affairs is due to a parasite, which, however, no one has so far been able to discover; and, on the other hand, it is well known that most of the fruit-growers do treat their orchards regularly with the lime-sulphur wash. Mr. Marlatt, one of the most eminent expert entomologists in the United States, who has paid special attention to this insect, in Bulletin 62 of the United States Bureau of Entomology, gives a résumé of the facts connected with the insect for each of the different States. He quotes Prof. Woodworth, of California, as saying that, 'although the scale does not occur at Berkeley, it probably does occur everywhere else in the state where fruit trees are grown, except in isolated plantings in the foot-hill regions. Usually, it is not seriously troublesome, though it may increase rapidly at any time and become a pest. The uniform treatment with the lime-sulphur-and-salt wash keeps it in check, and parasitism is often fairly efficient. In some districts, as about San José, where it has almost disappeared, the result may be due both to parasitism and to some obscure form of disease, as well as to the lime-sulphur treatment.' Taking the state as a whole, Prof. Woodworth says that it will be readily found in at least 25 per cent of the orchards, in injurious numbers in probably 10 per cent in any one year, and that from 25 to 40 per cent of the orchards are sprayed with the lime-sulphur-and-salt wash every year.

INCONSPICUOUS NATURE OF THE INSECT.

As I have already stated, the very inconspicuous nature of this scale has affected very materially its spread throughout the country. A small number introduced with nursery stock from an infested region may increase and spread widely through a locality, and the owners of the trees be quite unaware of its presence until attention has been drawn to it by the lack of vigour in the trees.

I will now pass around another twig on which the bark has been scraped in two places. Between these, in a space one inch long, there are from twelve to fifteen scales; but I think it highly probable that no member of the committee present would notice the insects or indeed be able to see them, unless his attention were directed specially to them.

INJURIES IN KENT COUNTY.

Mr. CLEMENTS.—I do not desire to interrupt you, but I may say to the gentlemen present that possibly I am one of the unfortunate members from a county where this pest is very prevalent. I think possibly Dr. Fletcher will bear me out in that. I think he knows the situation very well. I think that some few years ago—nine or ten years ago, was it, Doctor?—the San José scale was introduced into Kent county.

Dr. FLETCHER.—Yes, it was in 1896.

Mr. CLEMENTS.—I think several remedies were described at that time, but I want to inform Dr. Fletcher that within the last year or two—perhaps not over a year—nine-tenths of the orchards in the county that I represent are infested with this scale; and it seems almost impossible to operate with them. I know of a gentleman, Mr. Everett, who is a very well-known fruit-grower, who I think adopted every precaution possible, as far as spraying is concerned, as he thought it would be proper to spray them; but he mentioned to me a short time ago that he had something like 300 Northern Spy apple trees a year and a half ago on which no disease could be noticed; but last season he was unable to ship an apple out of the whole orchard. Now we have a great many well-known fruit-growers in Kent county who have been spraying with the different remedies which have been prescribed, and they seem to be getting discouraged. I would like to know from Dr. Fletcher the very best remedy that he can prescribe so that they might use it there.

The CHAIRMAN.—I would just call Mr. Clements' attention to the fact that he had better make his questions as short as possible.

Mr. CLEMENTS.—I will try. I think a great many members present have not got this pest in their constituency and I want Dr. Fletcher to deal with this important subject; that is the reason that I am taking up so much time. I might say that our fruit-growers, the men who are well up in fruit-growing, have heard of a parasite of the scale and desire that the parasite, if possible, be brought in so that it may work as beneficially here as it does in California. I do not know whether it will live in this climate or not; but I would like Dr. Fletcher to give me his opinion as to that.

A PRACTICAL REMEDY.

Dr. FLETCHER.—With reference to the parasite, if you will allow me, I will speak of that later. With regard to a remedy, there is certainly a practical remedy; but one of the troubles in the past has been that there have been too many remedies tried. The Ontario government have been investigating all the best known remedies. Their experiments, and all the experiments in every country where the San José scale is found have proved that a mixture of lime and sulphur, with, in general terms, twice as much lime as sulphur, boiled in water for a prescribed time, but not less than an hour, makes a wash which is a practical remedy, that it will hold the scale in check, and allow paying crops of fruit to be grown.

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By Mr. Black

Q. Unslaked lime ?

A. Yes, fresh unslaked lime, twice as much lime as sulphur, and both boiled thoroughly together so as to make a chemical compound. This is a remedy which, where it has been tried carefully, has become the standard remedy for the San José scale. There are other remedies ; but I think it is better to discourage their use, when we know that in the lime-sulphur wash we have a good practical remedy which has proved to be not only the best for killing the scale, but is also one of the cheapest that can be used.

There are two reasons why the San José scale has spread so much. One is its excessive and incredible fecundity ; instead of there being only one brood a year, as with some other scale insects, it continues breeding all through the summer. The second reason is that, being so small and inconspicuous, it is easily distributed from place to place with nursery stock. It has, besides, shown a great power of resistance to the ordinary insecticides and means of control which have proved efficacious against similar insects ; but, as I have stated, we now have a practical remedy in the lime-sulphur wash, if fruit-growers can be persuaded to use it more generally.

SPECIAL ATTENTION TO THE SUBJECT.

By Mr. Blain :

Q. How long has your department been giving special attention to the San José scale, how many years ?

A. Since 1894. The San José scale was introduced in America in 1870 to the ornamental grounds of Mr. Lick, at San José in California. In 1890 it had spread through California to Oregon and Washington. In 1893 it appeared in Virginia, east of the Rocky mountains. In 1894 it was found in several of the states. In 1894 it appeared in British Columbia also, but was promptly wiped out. In 1893 it was introduced into Mr. Clements' county. In January, 1897, Mr. Van Horn of Chatham sent me undoubted specimens from there. You will find from my annual reports that, having seen from its depredations to the south of us what a dangerous insect this was, we anticipated its appearance in Canada, and in 1894 published a warning article in our annual report, in the report of the Entomological Society of Ontario and in the *Farmer's Advocate*, of London, a paper with a very wide circulation. The fruit-growers were warned that this insect would probably soon reach Canada and do a great deal of harm, and they were urged to use the remedies which were best known. In 1897 this warning was repeated, and a special emergency poster was printed, giving a concise illustrated description of the San José scale and the best remedies. This poster was distributed to all the post offices throughout the counties of Kent, Essex and Wentworth and other counties where the scale was known to occur. This did a great deal of good in drawing attention to it.

PROVINCIAL LEGISLATION AGAINST THE SCALE.

About that time the Ontario government began a very active warfare against this enemy ; but, unfortunately, it soon became somewhat of a political question, which checked the work of repression. Unfortunately too, some fruit-growers who did not understand enough the danger from this insect, opposed the efforts that were made by the Ontario government, and in that very part of the country where now the trouble is worst, some of the men who had their orchards infested, bitterly opposed the efforts of the government to help them.

Q. The complaint, as I understand it, from the province of Ontario, was that the provincial government instructed the cutting down of such a large number of trees, and the owners of the trees resented that. Was that a mistake or was it not ?

A. It was not a mistake then ; but, according to the knowledge we now have, it was unnecessary. At that time, it was the only remedy known by which it was possible

to wipe out the scale. Unfortunately, the gravity of the situation was not understood by the people who owned the orchards.

Q. Are they continuing to cut them down ?

A. No. The resentment was so great that the work was stopped. No government could have persisted in it against the widespread public opinion that it was unnecessary.

Q. Is it a fact that the efforts of your department and of the Ontario department combined have been unable to check this scale in Ontario ?

A. By no means. We have been able to check it, and we hope to wipe it out altogether, if all fruit-growers will consult their own best interests and spray regularly every year.

INFESTED AREA.

Q. Is it much worse to-day than in was five years ago in Ontario ?

A. It is more abundant from one aspect of the case ; that is, the limits of the infested area in the province are practically still what they were five years ago ; but, inside the limits, the spread has increased enormously. On this map (pointing to a map of Canada), my pencil now covers the whole of that part of Canada which is infested to-day. That small strip hidden by my pencil, running from Essex along the north of Lake Erie to the Niagara peninsula and to the county of Wentworth, covers the whole area. This means, practically, wherever the peach is grown as a commercial crop. The San José scale occurs most injuriously at the eastern and western limits of this strip and at scattered points through it. This strip, however, covers the whole of the area of infestation by the San José scale to-day.

LIFE ZONES.

Now there is a remarkable fact in the distribution of life of all kinds, which affects this question : plants, insects and animals are confined to certain more or less clearly defined zones, which run through the country. These are called floral and faunal zones, and special names have been given to them in relation to the kinds of plants, birds, insects and other animals which grow and thrive under the conditions there found, thus producing associations which are remarkably constant in their distribution. One of these zones of life, which has been mapped out by Dr. C. Hart Merriam, the eminent American naturalist, is known as the Upper Austral Zone ; it is to be noticed that, long before the San José scale appeared in Canada, this very strip above mentioned was mapped out as belonging to that zone ; and, although the San José scale has occasionally been found outside this zone, it has not spread and has soon died out. That fact is important, because it gives reasonable ground to hope that the San José scale, bad as it certainly is where it now occurs, may not become a widespread pest in our country.

In answer to your question, the work of my department has had this effect : it has given fruit-growers definite information as to the nature of the San José scale and as to the preparation and use of the best remedy. Those who have applied this remedy, have succeeded in saving their trees and growing paying crops ; while others who have not, have failed, and, more, they have been an injury to their neighbours.

GOVERNMENT WORK TO CONTROL THE SCALE.

The federal government, through the Minister of Agriculture, has taken a very active part in this matter. The provincial government also did excellent work in Ontario ; it did, I believe, all that was possible under the circumstances ; and their actions throughout the campaign have been very wise, and the measures decided upon were well carried out by exceptionally efficient officers.

FUMIGATION STATIONS.

The Minister of Agriculture established fumigation stations, and the Ontario government insisted on nurserymen going to great expense in fumigating all nursery

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stock they sold. Many of these nurserymen naturally thought such expense was unnecessary, at first ; but I do not believe they think so now. Let me say, too, that I think they have carried out the law scrupulously.

OBSERVANCE OF LAW BY NURSERYMEN.

Certain statements were reported as having been made in the House recently, that the nurserymen in Ontario had not observed the law ; but I know as a positive fact that a great many of them, at any rate, have done so. I will cite the case of Mr. E. D. Smith, member for Wentworth, who happens to be present. I visited his nurseries, among others, and saw for myself that his work was being done thoroughly ; and the same was the case in other nurseries I have visited. I think the Ontario nurserymen, the provincial government and the federal government have done all that wisdom called for under the varying circumstances, according to the gradual development of our knowledge of the subject. The San José scale is more injurious and more difficult to control than any other insect that we have ever studied.

By Mr. Blain :

Q. If it is confined, and it is of course, to such a small territory, would it not pay the Dominion government and the local government combined to enter the infested area each year, for two or three years, and spray every one of the infested orchards, and stamp the pest out ?

A. That would of course become a question of political economy—whether such a large expenditure should be incurred for one part of Canada, at the expense of the rest of the Dominion—and would have to be decided by the government.

Q. But it is being done ; the whole of the money is being expended in that section now, if your statement is correct. What I say, is, with the amount of money that is being expended by the two governments in that section, would it not be in the interests of the Canadian people for each government to do something to try and stamp it out ?

A. It would be difficult and expensive to stamp it out now, because it has spread from the fruit trees to ornamental shrubs, and probably to some extent into adjoining woods. I think it is generally believed that it has now got so far that it is impossible to wipe it out entirely ; but I am confident that each man, in his own orchard certainly, can, by adopting the lime-sulphur remedy, reduce the infested area, and by spraying his trees regularly every year, secure paying crops all the time and improve the condition of his orchard year by year. The lime-sulphur wash not only destroys many kinds of insects which winter on the trees, but many fungous diseases also.

DISTRIBUTION OF THE SCALE.

By Mr. Wright (Kenfrew):

Q. How are the scales carried about from one tree to another ?

A. The young when born, are very small and can be blown by the wind for twenty or thirty yards. That has been proved by hanging up black cloths in orchards. The young scale insects, before they attach themselves to the bark, also have the habit of crawling on to other insects and small birds, and are carried in that way from tree to tree. But, in considering this question, we must look back over the general results since we have known anything of this insect in the East, and we find this curious condition of affairs, that, when the scale is first introduced into an orchard, it spreads very slowly from the tree upon which it was first introduced to other trees nearby. But after a time it spreads through the orchard with great rapidity. As a matter of fact, in Canada it has spread very slowly from one orchard to another, orchards only a quarter or half a mile away from infested centers having remained free of the pest for a long time. These curious facts concerning this insect, although they seem contra-

dictory, are at the same time proved by the ten years' experience which we have had with the scale.

FORMULA FOR EXTIRPATION OF SAN JOSÉ SCALE.

Now, I will deal with the question of parasites, which has been referred to by Mr. Clements.

By Mr. Lalor :

Q. How often do you wash your trees and how do you prepare your mixture ?

A. I will give all these details for the report. They were published in the report two years ago, but I will have them repeated. The wash is made thin enough to be put on conveniently with the spraying machine, and two applications in the year are required when an orchard is badly infested, one in the autumn and one in the spring. When an orchard is treated regularly, one application in spring before the leaf buds burst, is sufficient.

By Mr. Clements :

Q. What is the effect of fumigating nursery stock that may be infested by San José scale ?

A. It is absolutely cleaned of the scale. I have never known an instance of a scale on a tree coming through the fumigating house alive, after being fumigated in accordance with the standard formula which we recommend, viz., one ounce of cyanide of potassium, one ounce of sulphuric acid and three ounces of water, for every 100 cubic feet of space—exposure, 45 minutes. I have never yet heard of a single instance of living scales being found on trees imported into Canada, and which therefore had gone through the fumigating house.

SPRAYING MUST BE DONE EVERY YEAR.

By Mr. Blain :

Q. If the owner of an orchard sprays his orchard this year, would he have to continue it year after year ?

A. Yes, it must be done regularly year after year.

Q. It is not possible ever to drive it out of an orchard, is it ?

A. When you kill with one spraying 95 per cent, I feel sure that by continuing that treatment regularly you must drive it out in time.

Q. How long would it take ?

A. I think if an orchard were thoroughly sprayed twice a year for three years, that orchard would be cleaned. I have seen orchards cleaned in one year by thorough treatment.

Q. You know of orchards that have been cleaned ?

A. Yes.

Q. If that be the case, it does seem to me that a special effort on the part of the two governments would drive it out of Western Ontario altogether, and from an economic standpoint it would be a proper way to deal with it.

A. I am not a politician, but I believe one of the tenets of politics is that no government considers it wise to do anything until public opinion forces them, and so backs them up in whatever action they take. That is a question for the whole community in Canada.

Q. They seem to be doing a good deal now.

A. Wisdom like truth will out, you see. Sometimes it manifests itself in different directions. I think I answered your question, did I not ?

Q. Yes.

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PARASITES.

Dr. FLETCHER.—Mr. Clements brings up the very important question of the introduction of parasites. There is no doubt that special parasites do control and hold in check most insects in their own country. This is illustrated by the fact that our worst insect enemies are introduced species, which have come to this country without their own parasites. The white cabbage butterfly, which was introduced into Canada only about fifty years ago, has now spread from the Atlantic to the Pacific and is the cause of enormous losses every year. The Variegated Cutworm, the Hessian Fly, the Wheat Midge, the Cattle Horn Fly and Asparagus Beetles are others of these introduced insects, which came from Europe. They have spread and increased mainly because they were not held in check by their natural parasites. It has always been a most attractive field of investigation for all entomologists to try and discover, in their original homes, and introduce the parasites of insect pests, which have increased unduly when brought into other countries without their natural enemies. Notwithstanding the fact that some of the very best investigators have engaged in this work, and much time and money have been devoted to it, it has been found an exceedingly difficult matter to establish these useful friends in a new home; and it would appear that it is not an entirely parallel problem, to introduce a certain insect which thrives and increases in a new home, and also to colonize its controlling enemies. Predaceous enemies and parasites can only thrive and increase so long as they have an abundant supply of the insects which they feed upon, because as soon as they have reduced the numbers of their hosts so that they do not injure our crops, they have also brought down their own food supply, and to that extent have contributed to their own extinction. In addition to this, many of the parasitic enemies of insects are extremely restricted in the range of insects which they will feed upon, and, in the case of the San José scale, which is an exceedingly minute insect, there has not yet been discovered any special parasite which feeds upon it alone. There are, however, no less than eight of our native American insects which will occasionally prey upon the San José scale; but not one of these is confined to that scale, and, when others or larger hosts are available, they are preferred.

After many years of well directed effort, it must unfortunately be acknowledged that the only single marked success in this line of research has been the importation from Australia, into California, of a ladybird beetle to destroy the Fluted scale, which was working great havoc in the orange groves. This latter, however, unlike the San José scale, is a large and juicy insect, and the Vedalia ladybird beetle which was introduced, will also feed on other insects than the Fluted scale. The United States government, with characteristic enterprize, sent one of their best entomologists, Mr. C. L. Marlatt, to Japan and China to try and discover, what was not actually known definitely, the original home of the San José scale and also to secure, if possible, a supply of the special parasites which attack it there. Mr. Marlatt made a very extensive tour of investigation and brought back with him many insects which were found attacking the San José scale in its native home. The state of California has also another investigator, Mr. Compere, who has been engaged on this special work for several years; but we must acknowledge with much regret that up to the present time not one of these enemies of the San José scale has given any indication that it will be a useful factor in controlling the scale as far north as Canada.

As I have stated, Mr. Marlatt is one of the most competent entomologists in the United States and is the first assistant to Dr. Howard in the Bureau of Entomology at Washington. He has recently published as a report on his mission the most complete treatise on the San José scale which has ever appeared: Bulletin No. 62, Bureau of Entomology, U.S., Department of Agriculture, 'The San José or Chinese Scale.' It must be remembered that he went to China with the special object of finding a parasite and was therefore naturally interested in finding and introducing if possible such a parasite, because it was the main object of his mission. He took ample time for the

investigation, being gone nearly a year ; he is therefore better qualified than any one else to speak authoritatively on this important subject.

With your permission, Mr. Chairman, I will read a few short extracts from Mr. Marlatt's report which will show that his conclusions confirm the opinion I have already expressed. I regret exceedingly that this is the case, because, as Mr. Clements has pointed out, many of our Canadian orchardists are becoming discouraged on account of the trouble and expense of treating orchards infested by the San José scale, and it would be such an easy solution of the difficulty if we could, even at what might seem at first sight an enormous expense, bring in a parasite which would destroy the scale. Mr. Marlatt says :

'The control of the San José scale by parasitic and predaceous enemies is increasing all the time ; but there seems to be no likelihood that either such natural enemies as are now in this country or those which may hereafter be imported will ever do more than merely lessen the abundance of the scale. In other words, from past experience and from a large acquaintance with other similar scale pests, it is extremely improbable that, even under the most favourable circumstances, such natural enemies will reduce this scale as much as would one thorough treatment with the lime-sulphur wash or other standard remedy. The insect enemy of the scale can only exist when it has scale food ; hence, a normal balance is very soon reached, in which the scale and natural enemy fluctuate in relative abundance.

'The fact that a large succulent scale insect like the Fluted Scale of California has been controlled by a ladybird enemy, does not necessarily allow one to hope for the same result with the San José scale. The ladybird and other enemies introduced into California to control scales similar to the San José scale, have not succeeded in the same measure at all. This statement is made to correct hopes which may be aroused by certain popular articles which have recently appeared on the subject of parasites.

'The San José scale must be recognized as a permanent condition to be met in the growth of deciduous fruit trees.

'Orchards should be sprayed, according to well established methods, annually, as soon as the first sign of infestation is found. Fruit-growers and others interested have come to accept this conclusion and are facing the San José scale problem as one to be regularly dealt with, as with other established insect enemies of fruits.'

When speaking of the Asiatic ladybird enemy of the San José scale, which is the chief natural agency in keeping it in check in all regions investigated in China and Japan, Mr. Marlatt says :

'None of the colonies sent to northern states, that is, north of the District of Columbia, became established, nor gave any useful results, and subsequent experience, and particularly the elaborate tests conducted by Dr. J. B. Smith, in New Jersey, would indicate that there is very little likelihood of usefulness from this beetle for northern fruit regions.

'Neither the Asiatic ladybird nor any other predaceous insect—and this is true also of the chalcidid parasites, though perhaps in a less degree—can ever be expected to so thoroughly exterminate the San José scale as to give sufficient protection for commercial orchard purposes, where absolutely clean or unspotted fruit is an essential. Predaceous and parasitic insects can only survive in connection with their host species, and therefore ultimately there must be a natural balance which will fluctuate from year to year or period to period, in which alternately the parasite and the host insect get the upper hand, but both necessarily being continuously present.

'PARASITES NOT AS EFFICIENT AS SPRAYING.

'Where substantially clean fruit must be had, as for shipping and export purposes, spraying or some other direct means of control must be practised ; and, now that an inexpensive tree wash for the San José scale has been discovered, it is very much to the advantage of every one to spray regularly, rather than trust to control by natural enemies.'

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Notwithstanding all this, experiments have been carried on in the past, and will be continued, with the hope of finding a parasite which will be useful in Canada. By all means, everything possible must be done looking to this end. But in the meantime the scale is doing so much harm that the fruit-growers of Canada must do as we have urged them for ten years past, namely, apply the best available remedies now, and entertain the hope of getting a parasite as well at the same time. The remedy must be applied carefully, and it must be applied every year. Where the lime and sulphur wash has been applied for only one year, good results have followed in the shape of good paying crops of fruit ; and, likewise, where that has not been done, the results have been disastrous, the orchards have been destroyed, and the whole country has suffered.

THE SAN JOSÉ SCALE PROBLEM.

Now then, let us consider what is the problem to-day. It is practically what it was ten years ago. This serious enemy is firmly established in certain of our Canadian orchards, situated in one of the very best fruit-growing districts of the whole world. It is there doing an enormous amount of injury, but is not spreading much, if at all, beyond the margin of the area which has been infested for many years. At the present time there is little hope of getting any friendly parasitic insect or fungous enemy which can be relied on to control it ; and the whole question now remains, as it has for several years, in the hands of the fruit-growers. After many experiments a practical remedy has been found in the lime-sulphur wash, which, if it is applied regularly and every year, will destroy the San José scale to the extent that paying crops of fruit of all kinds can be grown. The only part of Canada which can be said to be infested, is the peach-growing districts of Ontario. The statements that the scale is abundant in British Columbia, are, I am thankful to say, inaccurate. There have been two or three very restricted occurrences in that province ; but these have been, as far as I know, entirely wiped out by the prompt destruction of the infested trees. There was a small infestation found at Kaslo last year, which was ordered to be wiped out and destroyed. That has been done, I believe, during the past winter.

MORE CAREFUL WORK NECESSARY.

Undoubtedly, wherever this scale occurs, the fruit-growers must take the matter up more vigorously, and must make up their minds to treat their orchards better, and do all their work more carefully, than they have done in the past.

By Mr. Clements :

Q. If spraying will destroy the pest, as far as I can see, in the county of Kent, there is not enough united effort along that line. I know a great many who have neglected their orchards altogether.

A. That is the whole question.

Q. Those who are interested do their work properly, I believe ?

A. The commercial orchardists are doing their work, because it pays them, but some of the small men—and that is the whole difficulty of the question—the men with a few trees or with small orchards—are neglecting their duty, because they say it does not matter. That is where government enforcement of the San José Scale Act was doing work in the province of Ontario, while they were able to keep up a vigorous campaign.

By Mr. Wright (Renfrew) :

Q. Will the scales thrive in a cold climate, or are they impervious to cold.

A. The San José scale has not occurred outside the little strip that I pointed out to you. That is all I can say. At one time it was supposed that this Chinese insect, which too is a native of the southern districts in China, would not exist in Canada. When it established itself in California, the fact was explained on the ground that it

there found the conditions that it required ; but the climate there is much hotter than that of any part of Canada. We now know that it can thrive in one part of Canada at any rate.

By Mr. Lewis :

Q. The district of infestation that you are pointing out on the map, is the most southern part of Ontario ?

A. Yes. The most southern part just north of Lake Erie. The scale has not so far spread out of that area. The statement that it is spreading through Canada is not the case ; it is spreading inside that area and the injury is getting worse day by day, but the infested area is not growing wider.

Q. Why is it restricted to that area ?

A. Chiefly, I imagine and hope, because of the climatic conditions which prevail there.

By Mr. Smith (Wentworth):

Q. There would not be any opportunity of it spreading through the nursery stock produced in Canada, for that is fumigated thoroughly. All that is imported is also fumigated and if everything else was done perfectly the scale would not spread.

A. No, that is perfectly true.

NO DANGER FROM IMPORTED FRUIT.

Q. Is there any danger from infested fruit ?

A. I do not think there is any danger at all on that score. When once the scales are fixed on a tree or on fruit they can never move again. The only possibility of infestation is from the young newly hatched larvæ. This means that insects on the fruit must be fully mature females, and that these must give birth to young near enough to fruit trees for the young to crawl onto the tree and find a favourable position to settle. It must further be remembered that these young scale insects can only move when quite young and for an hour or two after birth. I cannot see how young scale insects could be carried from infested fruit to growing trees in orchards. People do not eat fruit from a distance, in their orchards, or throw it into orchards when they have bought it.

Q. Infested fruit might be thrown around in a back yard and the scale could be carried by a bird to a tree that might happen to be in the yard ?

A. Such a thing would be very unlikely, I believe, in fruit districts. The peel of an apple or of a pear, when taken from the fruit, would soon dry up, when the mother scale would perish at once. In such a contingency, the females would not have time to bear young before they died of starvation. The scale is a living insect and must feed all the time. Moreover, there has never been a single instance recorded although closely looked for, where the San José scale has spread from infested fruit. The only possible way of infestation from fruit which I can imagine, would be for some one to deliberately place infested fruit in the crotch of a young tree, which had smooth bark, and where the scale could fix itself easily. I do not think there is any possible danger from that source ; and I am glad to find that such a high authority as Mr. Marlatt agrees with me in this opinion. On page 56 of his report already referred to he says :

The shipping of infested fruit from California has been going on for a great many years, and in spite of its wide dissemination in this country and abroad, there is not a single authenticated instance of the scale having been established from such material. The possibility of it, however, undoubtedly exists ; but the danger seems to be inconsiderable. The fruit is eaten in such places and the parings and waste material are usually disposed of in such a way that it would be very exceptional indeed for such fruit, or the young scale which might hatch on them, to get access to trees on which the scale could make lodgement. It would practically be necessary for the parings to be tied to a tree, or the fruit to be placed in the crotches of the tree, to

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secure infestation, and it is the belief of the writer that infestation from this source can be practically ignored.'

- *By Mr. Chisholm (Huron):*

Q. Does it infest the cherry?

A. Yes, the sweet cherries and, rarely, the sour varieties also.

Q. Is it on the wild trees?

A. This insect will occur on all kinds of trees except those of the pine family and orange trees.

Q. At that rate, if all the orchard trees were treated the scale might still be carried over and spread in the woods.

A. It certainly might spread into the woods, but fortunately it has not done so, so far as we actually know in Canada.

By Mr. Schell (Oxford):

Q. Is Bordeaux mixture effective in preventing the spread of the scale?

A. No, Bordeaux mixture would have very little effect on the scale, except from the lime it contains, which would render the bark uncomfortable for the young scale insects to fix themselves to. There is nothing in the Bordeaux mixture to destroy the scale.

Q. If a larger quantity of lime were used than is generally put in the Bordeaux mixture, would it be of any benefit in preventing the spread of the scale?

A. Only to a very small extent.

Q. Has it not any virtue when mixed with the sulphur?

A. Undoubtedly. The chemical combination of lime and sulphur produces compounds which are destructive to insect life.

Q. How would it do to add sulphur to Bordeaux mixture, which is commonly used?

A. So as to combine the Bordeaux mixture with it? That might be done without much trouble. The Oregon lime and sulphur wash has bluestone in it. The Bordeaux mixture is composed of bluestone and lime.

By Mr. Smith (Wentworth):

Q. Lime and sulphur would destroy the foliage?

A. Yes, it is for winter use only, or at any rate when the trees are bare.

By Mr. Schell (Oxford):

Q. Lime is not injurious to the foliage?

A. No, not alone. On trees that are sprayed with lime and sulphur wash, you do not require Bordeaux mixture, because it also is an excellent fungicide.

I think you referred, Mr. Clements, to California having been freed of the scale? As a matter of fact a large proportion of their orchards, between 35 and 40 per cent, are systematically sprayed with the lime and sulphur mixture every year, whether the scale is present or not, on account of the recognized value of the lime and sulphur mixture in preventing fungous diseases.

GOOD WORK IN ONTARIO.

By Mr. Smith (Wentworth):

Q. There has been marked advantage with us where people have sprayed, whether there was any scale or not. In regard to the control of the San José scale, in the district with which I am familiar, the only control has been in townships where the law enabling a municipality to pass compulsory legislation has been taken advantage of. That has been the experience in the township of Saltfleet, and I think one or two other townships. The town councils pass a by-law necessary to compel the people to take action, and then they appoint an inspector who sees that the scale is kept under control. Where that is not done the scale is spreading like wildfire, but in the township

of Saltfleet where this system has prevailed for three or four years, I do not think there is nearly so much scale as there was four or five years ago.

A. That plan has undoubtedly proved satisfactory with you ; but you see there are special conditions in the Grimsby and Winona districts. The great value of the land and its high productive capacity, have caused it to pass into the hands of men of capital. Most of your growers are commercial orchardists, and they have seen the advisability of adopting these remedial measures. It would be suicidal if they did not do so, for there is no doubt that where the remedies which I have spoken of have been properly applied, good results have always followed. It is the small man with a few trees who is careless and neglectful, and who exposes to injury all others living around him.

Q. A great many in that township would not do it unless compelled by the town council ?

A. It was a wise proceeding your securing such legislation.

By Mr. Lewis :

Q. There is no trouble then in remedying the evil ?

A. There is trouble ; but it can be done.

Q. There is no doubt about it ?

A. I have none. I am sure it can be done, and I believe the satisfactory state of affairs in California which is often referred to, is due to the fact that spraying with lime and sulphur has for ten years been the regular practice in many of the orchards. The statement that there are useful parasites at work there is also probably true ; but the favourable conditions, as the entomologist whose statements I quoted says, are due, first, to the regular systematic spraying and then, as he adds, this is 'probably helped by parasites.' But we ourselves know the direct benefits due to using this remedy in the high quality of fruit that is now being produced by some, even in the infested districts, and as Mr. Smith has told us, our best Ontario fruit-growers are actually using the wash as a regular practice, in many instances one man operating a large boiling plant and preparing the material for his neighbours.

The San José scale has been longer established in the counties of Kent and Essex than in any other part of Canada, and although some of the leading men are recognizing the facts which I have laid before you, and are doing this work carefully, they are badly handicapped by others living around them who are discouraged, and are not following their example. There must be systematic treatment of the orchards every year, on account of the ease with which the minute scale insects are carried from orchard to orchard by other insects or by birds. As already stated, it has been found that the newly hatched young can be blown for many yards, a fact ascertained by hanging up black cloths near an infested tree when a strong wind was blowing. Then again, in the alleged case of small birds carrying the scale across the Niagara river from the other side, I do not know if the scale is abundant enough on the other side to be a source of danger ; but in the summer time, when small birds are rearing their young, they do not fly very far from their nests. This habit of short flight is also one of the troubles with some insects imported from abroad, to control other species. Many of these parasites do not fly long distances, and when they have been secured and introduced at much trouble and expense, they not only do not spread rapidly, but it is with the greatest difficulty that they can be kept alive. The Asiatic ladybird beetles brought from China by Mr. Marlatt, thrive all the time there was plenty of the scale for them to feed upon ; but as soon as the numbers of the scales were lessened, the predaceous beetles began to starve. In some places it has been only with difficulty that they have been preserved.

FUNGOUS PARASITES.

Other useful parasites of insects are found among the fungous diseases, but these are hard to propagate and establish where they are required. It has been assumed

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that, if a fungous disease will attack an insect in one place and the same insect will spread to another locality, therefore, the fungous disease will also thrive in the new home. We have found, however, that such is not always the case. There is in Florida a fungous disease which has done good work in destroying the San José scale; and in Nova Scotia we have absolutely the same species of fungus attacking the common Oyster-shell scale. We secured infested Oyster-shell scales and introduced them with great care into a locality where there was plenty, not only of the San José scale but also an abundance of the Oyster-shell scale, but our efforts were all in vain—we could not get the fungus to spread from one host to the other—notwithstanding the fact that in Florida, under different conditions, it is a most effective ally of the fruit-grower. We know that a warm, moist atmosphere is necessary for the increase of many fungous diseases, so that it would appear that the climatic conditions in Western Ontario are not such as to allow that fungus to thrive. The question of introducing parasites is of course most important. If we could get the parasite to do its work with us, and thus save the labour and expense of spraying, it would be a grand thing; but up to the present it has been such an exceedingly difficult matter, that I have very little hope at the present time of obtaining such a fungus or insect friend. But the effort must be continued. We must keep on looking for a suitable parasite: and we may ultimately find one. In the meantime, I urge most emphatically on all fruit-growers the wisdom of spraying their trees regularly with the lime-sulphur wash, until we discover something better.

THE LIME-SULPHUR WASH.

By Mr. Chisholm (Huron):

Q. In case of heavy rain coming after the spraying, would the spraying be effective?

A. Heavy rains, within an hour or so, would reduce the effect of this wash to some extent; but not to the same degree as with some of the other washes which are used as sprays. For instance, if you spray with Bordeaux and Paris green, and a heavy rainstorm comes on immediately afterwards, the effects are very much reduced; but with the lime-sulphur wash this is not the case. It is extremely adhesive to the trees, and covers the trees with a clearly discernible deposit. It is recommended by Mr. George E. Fisher, for many years San José scale inspector for Ontario, that two applications should be made. The lime in the wash makes an easily seen deposit on the trees when it dries. This makes it easy to detect if any part of the tree has been missed in spraying. It is therefore always a good plan to take a second look at the trees, after the work is finished, to see if there are any parts which require touching up. This is an easy matter when everything is ready and at hand. Every part of the tree must be covered with the spray to get good results.

By Mr. Schell (Oxford):

Q. By adding sulphur to the Bordeaux mixture, would not the one application get rid of the codling moth and the San José scale at the same time?

A. No, I do not think that would answer. The lime and sulphur wash is injurious to foliage, the Bordeaux mixture is not. We can mix Paris green or arsenate of lead with Bordeaux mixture for the codling moth and fungi, but not with the lime and sulphur wash, because it would injure the foliage if used in summer time.

Q. Lime is not injurious?

A. No, but the combination of lime and sulphur is.

Q. You can add 18 lbs. of lime to the 40 gallons, whereas the Bordeaux mixture calls for only 8 lbs.

A. The quantity depends upon the formula used in making the mixture.

By Mr. Chisholm (Huron):

Q. Would not the sulphur and lime form sulphate of lime?

A. Chemists tell us that the injurious effects of this wash on insects are due to polysulphides and thiosulphate of lime; but it is not known quite how they act. The chemistry of this mixture is very complicated, and I do not understand it. Mr. Shutt will be able probably to explain the matter when he comes before the committee. I know that the chemical combination of lime and sulphur is injurious to foliage, if sprayed on to trees in active growth. The usual formula for the Bordeaux mixture, which is now recommended for use on fruit trees, and which is very generally used through Ontario, is: lime, 4 lbs.; bluestone, 4 lbs., and water, 40 gallons. The original formula which is still used for preventing potato rot contains 6 lbs. of bluestone instead of 4 lbs.

By Mr. Schell (Oxford):

Q. I know what the formulas are.

A. I am afraid I do not quite understand your question, then.

Q. Reference was made to lime being injurious to foliage. I do not think it is.

A. I never heard that it was.

Q. They use as much as 18 lbs. in 40 gallons.

A. Lime wash is not injurious to foliage. It may be used in almost any strength. In Western Ontario some fruit-growers have used even more than the amount you have mentioned in making their lime and sulphur wash, but it adds very much to the trouble of spraying.

Q. I have been using different mixtures in experimenting and have used a stronger mixture than it is customary to do. I have used more lime because, to a certain extent, it counteracts the injurious effects of Paris green on the trees.

A. Yes, lime undoubtedly neutralizes the caustic effects of Paris green on foliage. Lime to at least an equal weight with the poison should be used in all Paris green mixtures.

THE WORK OF THE DIVISION OF ENTOMOLOGY AGAINST THE SCALE.

By Mr. Blain:

Q. What is your department doing to drive out the San José scale?

A. The Minister of Agriculture has established fumigating stations at certain ports of entry, at which alone any nursery stock from outside countries is allowed to be brought into Canada. There, men who are experts at handling nursery stock, unpack and fumigate all trees which are in the least likely to be infested. In that way all fresh importations of the scale are prevented. In addition an extensive correspondence is carried on, every year amounting to between three and four hundred letters, on this one insect alone. In these letters information on the insect is given where it is needed, and advice as to remedies is also given. Furthermore, almost ever since 1904, an article has been published every year, in our annual reports giving a résumé of the subject, with the latest information as to remedies.

Q. But you have no officer who goes to the sections where it is spreading so much at any time of the year, have you?

A. I leave to-morrow night for one of the very sections.

Q. You go annually, do you?

A. I go very often, sometimes more than once a year, and altogether, I have made a great many visits, examining the orchards and advising the owners what remedies to use. However, I was not in the San José scale districts at all last year.

By Mr. Clements:

Q. Can you tell me, from the information you may have from my district, whether they are using the lime and sulphur mixture pretty extensively?

A. No, I am afraid they are not. Some are, but most are not. As is the case elsewhere, the men with most at stake, with large orchards, are doing so: because they know that it pays them to do so. Mr. Van Horn, of Chatham, who was the first man

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in Canada unfortunate enough to get the San José scale in his orchard, used the lime-sulphur wash as far back as 1897, and with excellent results. He cleaned his trees entirely, as is stated in my annual report for that year.

A NEW REMEDY.

Q. I might say for your information, because it may be well worth looking into, that there is a mineral water which some of the prominent fruit-growers in my district have tried, and they claim that it is one of the most effective remedies they have used.

A. Do you know what it is composed of ?

Q. I think it is sulphur to a great extent.

A. I should not like to trust it unless it contains something else.

Q. I think it is crude oil and sulphur.

A. Crude oil is a good remedy, if used with care. It has been used on apple trees with great success, but it is rather dangerous to use on other kinds of fruit trees.

Q. I know one gentleman who has used it on tender bushes several times, and it has had a good effect.

A. Of course the treatment would be easier to apply carefully on a small bush. I do not know of this remedy you mention ; but I shall inquire into it .

DIFFICULTY WITH LARGE TREES.

Q. Complaints are made of the difficulty of getting at the large trees to spray them. I suppose the scale would be on the leaves as well as on the limbs ?

A. Those large trees are one of the greatest troubles in all this work. Along the north shore of Lake Erie there are some very large pear and apple trees and the thorough spraying of these would be a troublesome business. There is only one possible thing to do, that is, to trim these big trees until all parts can be reached by nozzles, at the end of extension poles. When a tree gets to be 40 feet high, spraying becomes an expensive and troublesome operation. It can be done of course, but it is more expensive. I should advise that those large trees should be trimmed back so that they can be treated properly and conveniently. Another plan which would answer the same purpose would be to trim them back and regraft them.

By Mr. Black :

Q. As we have really only one effectual remedy, I presume the best way would be to hold to that one and eliminate all the others ?

A. That is my opinion, until we get a better.

Q. And investigation should not go towards new remedies at all but to the effective application of the best ?

A. I think from the point of view of the practical fruit-grower, he should use the best remedy that is available. From my standpoint as an investigator, I must seek the whole world over, if necessary, to try and find a better remedy.

Q. But the great trouble is that the small growers and the indolent growers will not apply the remedy ?

A. That is it. The small growers say it is not necessary for them to go to the trouble and expense to spray, so they do nothing.

By Mr. Clements :

Q. It seems to me that if this scale is confined to that one district, it would be a good thing from an economic standpoint if the federal and Ontario governments would give better attention there and take care of it; it would be money saved to the Dominion ; otherwise it seems to me that it may spread all over the country.

A. Well, the fact of the matter is that, so far, this insect has been confined to a certain area which is comparatively small, and we do not know that it will thrive when

it gets outside of that area. It is a striking fact, that for nearly 10 years it has not spread injuriously outside of that little strip in Ontario, which I have pointed out.

Q. The fact of it starting in British Columbia and in the Niagara district would almost prove that it is only in those districts that it is likely to thrive ?

A. It looks very much like that ; but of course we cannot tell.

By Mr. Black :

Q. Has the San José scale ever got into Nova Scotia ?

A. No, it has never appeared anywhere else in Canada, except in that strip in Ontario, which I have pointed out, and in three small isolated spots in British Columbia, where it was easily destroyed by promptly cutting down the infested trees. It appeared first in Canada at Chatham, Ontario, in 1896, and was at Niagara in 1897, in the orchard of Mr. Thonger. After that it ran rapidly through these counties (indicating on the map).

By Mr. Lewis :

Q. What counties are those ?

A. All the counties north of Lake Erie, from Essex to Lake Ontario, and as far as Wentworth. I have heard it stated that the scale has been found on trees in Toronto, but I have not been able to confirm the rumour.

Q. How is it in Middlesex ?

A. It has done no harm there.

By Mr. Schell (Oxford):

Q. The county of Norfolk borders on Lake Erie. Is the San José scale there ?

A. I believe there are some localities, but how far back from the lake the infestation extends I do not know.

KEROSENE EMULSION FOR SCALE.

Q. Do you ever use kerosene emulsion ?

A. It does very good work, if repeated when necessary. If an orchard were badly infested with the scale, I would use the lime-sulphur wash in the spring, and then during the summer would put on two applications of kerosene emulsion.

Q. How do you get the kerosene to mix with water ?

A. By adding soap to the water. You make soapsuds by boiling $\frac{1}{2}$ lb. of soap in a gallon of water till all is dissolved, then the oil will mix with it freely ; 2 gallons of kerosene mixed with the above quantity of soapsuds will give 3 gallons of stock emulsion, which, when diluted, will make 30 gallons of wash, ready to use.

Q. Hard soap ?

A. The ordinary hard soap or soft soap. A pound of hard soap or 1 quart of soft soap.

By Mr. Chisholm (Huron):

Q. Will the application of lime and sulphur destroy the Oyster-shell scale ?

A. Yes, and the spraying should be done late in the autumn. In some experiments I tried with this wash for the Oyster-shell scale, it was not quite as effective as I had hoped it would be ; but on the whole it was satisfactory. The Oyster-shell scale is active only from the beginning of June to the beginning of August. After that, this injurious pest of fruit trees is represented merely by a cluster of eggs beneath a dead scale, which is the dried up body of the mother scale insect. Early in the following June the small white eggs hatch, and the active 6-legged young crawl all over the tree, looking for a place to fix themselves. The spraying of infested trees with a simple lime wash in autumn, one pound of lime in each gallon of water, covers the trees with a deposit which will flake off during the winter and carry the Oyster-shell scales with it.

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Q. In the county of Huron we have the Oyster-shell scale very plentifully ; but we have not seen anything of the San José scale.

A. The Oyster-shell scale is not nearly as bad even with you as it is in some places. It is also very abundant in some parts of Quebec and Nova Scotia.

By Mr. Black :

Q. I have seen old orchards lime-washed the same as you would lime-wash a house, with benefit.

A. Yes, a man who will take all that trouble to make his orchard look neat and clean will do all the rest of his work well.

By Mr. Clements :

Q. A correspondent of mine writes to me from Chatham as follows :—

‘To give you a slight idea how this scale is progressing, I might state, that we on the river below Chatham had no idea that there was any within miles of us. Now my pear orchard of 900 trees is alive with the pest from end to end, and likewise, my peach orchard of about 1,100. The latter, as all our peach buds are killed (including kinds I never knew to be destroyed before), I am cutting off to stubs about 4 feet long.’

A. What was it that destroyed the buds ?

Q. This scale.

A. Is that Mr. Backus, Mr. Clements ?

Q. Yes.

A. He is a good active man and is very much exercised just now on this subject. I have heard from him recently also. The scale, however, was at Chatham many years ago.

Q. Do you think it was in his district ?

A. I am sure it was. It appeared first at Mr. Van Horn’s.

Q. Mr. Van Horn is up the river. Mr. Backus and he are about ten miles apart.

A. Well, yes ; but I should speak of two places only ten miles apart as being in the same district, as far as the distribution of an insect was concerned. Mr. Van Horn’s was not the only orchard in which the scale was to be found, when I visited him in 1897.

Q. There were only a few spots, I know, at that time.

A. It was all through your county soon afterwards. I think you will see that, if you will look up Mr. George E. Fisher’s reports to the Ontario government, of about that time. Was it not at Guilds some of the fruit-growers were going to brain Mr. Fisher or shoot him ?

Q. Well, things are in a pretty serious state down there.

A. They are in an extremely serious state, Mr. Clements, and you could not have done your county a better service, I believe, than by drawing attention to it at the present time, so that the fruit-growers may do more, at once, to protect their own interests against this enemy. In the meantime the chief reliance must be on the individual efforts of those men who have so much at stake. Whether the danger is so great, and the public interest is sufficient, to justify the government doing more than they have done, is, of course, a thing for them to decide. I think that the federal government is rather restricted in what it can do in these matters by its proper relations with the provinces. I feel that my chief, the Minister of Agriculture, has done almost, or rather quite, as much as he could do without interference with provincial matters, and he has been to very considerable expense for a great many years in protecting the fruit-growers of the Dominion from further importations of this pest.

Q. I fear that the general public do not realize the seriousness of the situation. I know what it is myself, and I know that our orchards are all going to be destroyed, unless something is done. If this preparation you speak of is effective and each one of the fruit-growers is compelled to use it, a change for the better may very likely take place?

A. I do not know of any greater danger threatening than that from the San José scale in the districts where it has gained a footing. The danger is just as great to-day as it was five years ago. As to its spreading, it is going through orchards and into more orchards in the infested district. It is a very fortunate thing for the rest of the country that it does not spread beyond there. However, it is spreading enormously inside the known limits of occurrence, and if anything can be done to stir up the farmers and fruit-growers in that district to greater and more concerted efforts, I think it should be done as soon as possible.

By Mr. Bain :

Q. What proportion of the apple producers would you term commercial men ?

A. Decidedly more than 50 per cent, and through the Niagara peninsula I should say 75 per cent.

Q. It is now almost ten years since you commenced to give your attention to it—I am speaking of this department—and the Ontario government did the same thing—how then do you account for the fact, that notwithstanding your efforts, it has become worse and worse every year in that section. Is it that the fruit-growers do not believe what the representatives of the two governments say ?

A. Well, the effect of belief is usually action, is it not ?

Q. Yes.

A. Well, they have not acted. What they believe I do not know.

Q. Under the circumstance do you not think some more drastic measure, or some special effort is required, on the part of your own department and the Ontario government as well ?

A. Our own department—I can only speak for my own division—is using every effort it can.

Q. It does not—I may be wrong, correct me if I am—seem to do a very great deal when you say that you yourself are devoting a great deal of attention to it, from time to time, and not very specifically, because you were not up in the Niagara district last year, and nothing was done ; that is not a very special effort to stamp out a disease which seems to threaten the whole future of that section.

A. There are many other diseases to stamp out and many other subjects demanding attention at the same time. There are other provinces than Ontario in the Dominion and all have their troubles. There are only about twelve hours a day one can work and there are enough diseases and insects to take every minute of that time not only of the three men in my division but a great many more.

Q. That is a good answer but does not meet the situation. That only means more money and more men. I want to say in the face of everything you people have done, and I am not complaining of that, and in the face of what the Ontario government has done, and keeping in view the fact that the San José scale is only found in the small section of Canada to which you have referred, notwithstanding all your efforts, it is getting serious and more ought to be done.

FRUIT-GROWERS NOT CAREFUL ENOUGH.

A. Now I must give you the answer which I did not want to give ; it is simply this, the men most concerned are not doing their duty by themselves and by their neighbours. They are not doing what common sense would dictate they should do to protect their crops and save themselves from loss.

Q. It is a strange thing to me that if a man has an orchard and he finds that he can save it and make money out of it by applying the remedy you suggest, it seems strange to me that he should not do it.

A. Indeed it does to me too. I have been studying injurious insects all my life, and it has been a constant marvel to me that well-tried remedies which have been proved to be efficacious and by which disproportionately enormous savings can be made are not more quickly and more generally adopted. However, it is encouraging to find

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that year by year the results of experiments by specialists are being put in practice more and more and are being quietly absorbed into the ordinary methods of horticultural and agricultural science.

By Mr. Schell (Oxford):

Q. All over the Dominion where fruit is raised, especially apples, although experiments have proved conclusively that it pays to use the Bordeaux mixture to get rid of the codling moth and the scab, and that it would save hundreds of thousands and probably millions of dollars to Canada as a whole, if people would only spray systematically and efficiently, yet they will not do it.

A. I believe there is an average increase of 75 per cent in the profits on every tree they spray, a fact which is fairly well known and yet many fruit-growers have not even yet adopted spraying as a regular yearly practice.

By Mr. Clements :

Q. The state of Massachusetts, I understand, is incurring a large expenditure, and different other states have made large appropriations, to get rid of the San José scale ?

A. Those large expenditures which you refer to were made for work against the Brown-tail moth and the Gypsy moth, two very injurious insects, which attack all kinds of plants. They were both of them accidentally introduced into Massachusetts, but now give evidence that they may spread over the whole of the United States, and perhaps extend their ravages into Canada. At first the trouble was dealt with by the state of Massachusetts alone, but as these insects have now spread into several other states, the federal government has taken the matter up. With regard to the San José scale, past experience seems to show that it may not spread widely in Canada, and therefore it is a special matter for the consideration of the people living in the infested strip of country. The importance of taking more vigorous steps to control the San José scale is very great indeed, owing to the losses which are going on every year, in one of the very best fruit-growing districts of the whole Dominion, where the soil and climate seem to be of the most favourable nature for producing large crops of the highest quality of all kinds of fruit, and where large sums of money are already invested in this important industry.

By Mr. Lewis :

Q. Would you suggest such a law being passed as that fruit-growers use this remedy or have their trees cut down ?

A. No, I would not.

Q. Why not ?

A. Because I have never known legislation of that nature to be very successful. Mr. Dryden, after much thought and care, caused a San José scale law to be passed in Ontario, but its enforcement had to be relinquished. I think as Mr. Schell has indicated, a better course is to keep on pointing out to the fruit-growers of the country, as ordinary business men, the advantage of adopting remedial measures—that by a small expenditure they could make a large saving. more of these people will probably act upon the advice given them. The very discussion we are now holding must have an effect in inducing some of those who have never sprayed, on reading the report, to make up their minds to give that operation a trial this year. I know well that if they once begin, they will never give it up again, because the benefits are so great. The legislation requiring the cutting down of trees was not very fortunate. I think the quiet influence of the many men who are making money by spraying their trees, and the getting of the subject frequently discussed before Farmers' Institutes and meetings of Fruit Growers' Associations, will do far more than all the laws that can be passed.

By Mr. Wilmot :

Q. I think if the law is not observed and is not effective, there is not much use in legislating. It would be like the laws passed to compel people to be good and moral.

A. I don't think they do much good, but the enactment of legislation is not a question I can discuss. I know that we have a practical remedy, and every wise man who has a large amount at stake should adopt it and protect himself and his neighbours from loss. I know from very careful experiments that the lime and sulphur remedy is effective against the San José scale and that orchards which are sprayed with it are at the same time freed of many fungous diseases which are injurious to fruit crops. In California the fruit-growers spray their trees with this wash, whether there is any San José scale or not, the higher quality of fruit they get from the sprayed trees much more than paying for the application.

By Mr. Clements :

Q. Have you thought of sending any of your officials to Kent county in the near future ?

A. I do not think anything has been decided as yet. The provincial government have their regular inspector, Mr. J. F. Smith, an energetic man who is doing excellent work.

THE APPLE MAGGOT.

If there are no more questions on the San José scale, Mr. Chairman, there are one or two other insects which I should like to bring to the attention of the committee.

An insect which has been known to occur in Canada for some years, but which has done us more harm during the past year than at any previous time, is the apple maggot. The maggots are the progeny of a small fly which lays its eggs beneath the skin of the half-grown apples. On hatching, the young maggots tunnel in every direction through the fruit, leaving discoloured channels. The apple maggot is doing a great deal of harm in some orchards where it has gained a foothold—in a few places in the province of Quebec, and in certain parts of New Brunswick and Ontario. This is a difficult insect to control. The female flies insert the eggs into the flesh of the apple by means of a hard egg-laying organ, consequently the maggots cannot be reached by any of the poison sprays such as are used for codling moth and other insects which feed on foliage. The only remedy which has given any good results is the destroying of all windfalls during the latter part of the summer. The maggot remains in the flesh of the apple for some time after it falls to the ground. They then leave the fruit and burrow into the ground. Here they pass the winter and the mature flies do not emerge until the following spring.

By Mr. Clements :

Q. What is the name of the insect ?

A. The apple maggot.

By Mr. Lewis :

Q. That is the white maggot which leaves a black trail through the fruit ?

A. Yes, and for that reason it is sometimes called the railroad worm.

By Mr. Schell :

Q. That is not the same as the codling moth ?

A. No, the codling moth burrows a large hole around the core of the apple and eats its way out through the flesh to one side. The apple maggot makes small burrows all through the flesh of the fruit in every direction.

By Mr. Lewis :

Q. Could the insect be stopped by putting bands around the tree ?

A. No.

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Q. Some people do it ?

A. Those are for the codling moth, the caterpillars of which spin their cocoons on the trunks of trees after they leave the fruit. When the bands of burlap or other material are tied around the trunks, the caterpillars spin up beneath them and can be easily destroyed. The apple maggot burrows through the flesh of the apple, and never occurs on the trunks of the trees. There are sometimes half a dozen of them in one fruit at the same time. The insect affects certain kinds of early or sweet apples more than others. When attacked, the fruit drops to the ground. One of the methods suggested for controlling it is the gradual elimination of early and sweet apples liable to attack from orchards, in the districts where it is prevalent. The most important remedy is the constant destruction of windfalls by keeping pigs or sheep in the orchards or by removing the fallen fruit at short intervals.

Q. Does that remedy it, allowing pigs in the orchard ?

A. Yes. If you will allow enough pigs in the orchard to destroy all the fruit as it falls before the maggots leave the apples and enter the ground. This has been a bad fruit pest in Maine and in some parts of the New England States for many years. It has done a great deal of harm and occasioned great anxiety. There is, however, less injury to-day than there has been in the past, showing that the remedies prescribed are having some effect. Possibly too parasites are helping, although they have not been detected. Injurious insects, when they first appear in a new locality, attract a good deal of attention from their abundance; but their numbers fluctuate, or by the gradual development of parasites they may disappear again. There are one or two introduced insects which have not that character. For instance the Colorado potato beetle seems to be just about as abundant every year, although we know that enormous numbers are destroyed every year by farmers with poison mixtures, and besides, there are over 20 different kinds of parasites which prey upon the species. The apple maggot has fortunately never shown such powers of persistence, and by the adoption of the remedies recommended, such as the destruction of windfalls, this insect may be controlled in a large measure.

Q. It has only appeared in certain parts of Ontario ?

A. It first appeared in Canada in 1878, in the Bay of Quinté district, and is now in Prince Edward county. It is doing a good deal of harm in one place in New Brunswick and at one locality, Como, Quebec, on the Ottawa river.

Q. Has it not been in Western Ontario for years ?

A. I think not, I never heard of it. It is one of the worst enemies of the apple shipper, because its presence cannot be easily detected by the outside appearance of the apple, and when the fruit is packed and sent to market, it may prove to be useless, on account of the ugly discolorations inside the fruit.

REMEDY FOR CUTWORMS.

I wish again to bring before the committee a remedy for the destruction of various kinds of cutworms which appear in the spring and do a great deal of harm in the months of May and June, by destroying small seedlings of all kinds when first put out, and roots grown from seed, such as turnips, mangolds and other field crops. These caterpillars are generally known by the name of cutworms, from their habit of cutting off the plant at the surface of the ground, and probably do more injury to field crops than all the other insects put together. My object in bringing this matter before the committee is to again draw attention to the remarkable results which have been obtained by using bran and Paris green mixed into a mash and then distributed over the fields. In the important fall wheat growing districts of southwestern Alberta, and all up through the foothills of the Rockies as far north as the Edmonton district, during the past season, thousands of acres were attacked by cutworms. They devastated whole fields not only of the root crops I have mentioned, but of oats, wheat and other crops. This was where no treatment was resorted to. Where applications of the Paris green and bran mixture were made, the attacks ceased almost immediately. We have

received many letters from farmers and others in the West acknowledging the remarkable results secured by using this remedy.

Q. How do you apply it ?

A. Simply by spreading the mixture broadcast over the land.

Q. Not on the leaves ?

A. No, on the soil.

By Mr. Wilmot :

Q. After the crops have been sown ?

A. After the crops are above the ground and as soon as the caterpillars appear. They come in such enormous numbers that their presence is generally very easy to detect. This remedy which at first seemed to many, so unpractical that they would not even try it, has been found remarkably effective. It is worth the while of everybody who grows crops either in fields or in gardens to know of this mixture, for think it may be claimed that through its means there is now no difficulty in controlling cutworms, which every year do such an enormous amount of harm.

By Mr. Clements :

Q. In my district they grow a good deal of corn. I myself had a large field of corn, but of the first crop I never got even as much as a spear ; it was all cut down by cutworms before it came up through the ground. In such a case the remedy you speak of, I think, would not apply.

A. Yes, we have found it very successful in field practice, in just such cases as you mention.

Q. Does the worm cut the corn off before it comes up ?

A. No, but just after it is up. The cutworms hide in the soil during the day. They come out at night and crawl all over the surface looking for food, and cut off all kinds of young plants directly they appear above the ground. The mixture prescribed is made in the proportion of $\frac{1}{2}$ lb. of Paris green to 50 lbs. of bran.

By Mr. Lewis :

Q. Will not the cutworm eat corn before it appears above the ground ?

A. No, they eat the corn plants after the shoot appears above the ground. Wireworms will, but cutworms not until after it comes above the ground.

By Mr. Finlayson :

Q. Do you mix the Paris green and the bran dry ?

A. No, the bran is first dampened by sprinkling it with a little water or sugar and water and mixing thoroughly, you make the bran damp enough for Paris green to adhere to it. Salt may also be used instead of sugar, a few ounces to a gallon of water.

Q. You do not spray it ?

A. No, put it on by hand ; make the mixture dry enough to run through the fingers easily. You can use anywhere from 25 to 50 lbs. of bran to the acre. When the cutworms are abundant the larger amount is better.

By Mr. Lewis :

Q. Over an acre ?

A. Yes, that amount will cover an acre if scattered carefully. That was the amount used to the acre last season in the sugar beet fields of the West. For gardeners I consider this one of the best remedies that has ever been discovered.

By Mr. Wilmot :

Q. And the proportion of Paris green ?

A. One pound to 100 lbs. of bran.

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PLUM CURCULIO.

Q. What is the best remedy for the plum curculio ?

A. The plum curculio last season did more harm to the apple crop than to plums. There were very few plums in some parts of Ontario, and the beetles turned their attention more to apples than is usually the case. Spraying for this insect is not so effective as it is for the codling moth, but at the same time it always pays to spray, and the practice is now becoming very general of spraying orchard trees of all kinds in the spring with the combined Bordeaux mixture and Paris green—bluestone 4 lbs., fresh lime 4 lbs., Paris green 4 ozs., and water 40 gallons. This is a remedy which gives such good general results that it is not advisable for any fruit-grower who wishes to grow any of our tree fruits of good quality and for profit, to attempt to do so without using it.

THE ASPARAGUS BEETLES.

Another insect which did a great deal of harm last summer was the asparagus beetle which attacks the asparagus in the spring when it is ready for the market. This is a small beetle about one-quarter of an inch long, greenish black with 3 pale spots on the back, a red neck and a yellow margin to the wing cases. The mature beetles appear in spring and eat out holes in the sides of the asparagus heads, and injure their appearance very much. There are two kinds of these beetles which generally occur together, the one described above and another kind of the same size but scarlet with black spots on the back. The former of these beetles was introduced into America from Europe fifty years ago, the latter not till 1881, and both spread to Canada in 1898. They have done noticeable harm in western Ontario for three or four years. They were troublesome in Toronto last year and have now spread as far east as Ottawa. The chief remedy is to dust the plants during the summer with a poisonous mixture, such as Paris green and freshly slaked lime, or to spray them with a mixture containing soap to make it adhere to the plant. Much help can also be given by poultry. Young chickens and other poultry eat the beetles readily in the spring.

FARM WEEDS.

The question of weeds is one that is always of great interest to everybody, whether they are working gardens or farms. For many years special attention has been paid to this subject by the botanist of the experimental farms, and more recently by the Seed Division under Mr. Clarke, who has by his careful surveillance of all commercial seeds imported or offered for sale, been of immense service to the farmers of Canada. Through that department also a great deal of good has been done by distributing collections of weed seeds all correctly named, so that they could be recognized, and by pointing out to farmers the ease with which the seeds of weeds can be detected and recognized among crop seeds. Of course, the seeds of every plant have a characteristic appearance, and their recognition is simply a matter of enlarging them with a cheap magnifying glass, so that they can be more easily examined. All seeds of weeds can be recognized easily by examining the crop seeds in which they are contained. The effect of the Seed Division's work brought about a most marked improvement in the nature of the seeds offered for sale in the Canadian market to-day. In addition to this, considerable work has been done in distributing information with regard to the nature of the different plants. This has been done through public meetings and through letters to the newspapers and to individuals. The farmers of Canada are exceedingly interested in this matter. To meet the demands for information, the Minister of Agriculture has caused to be prepared through Mr. Clark's branch, a large and beautifully illustrated bulletin containing 52 coloured pictures of the worst weeds and 4 plates giving pictures of 80 weed seeds most likely to occur in seeds offered for sale or imported from other countries. It is hoped in this way to give valuable help

to everyone interested in farming, concerning the nature and habits of weeds and the best methods of dealing with them, drawn from the experience of the best experimenters in all parts of the country. In every locality from 25 to 30 specially troublesome weeds will be found which will differ according to the locality and climatic conditions. All of these enemies can be controlled with greater ease if their nature is known. It is not worth while, perhaps, going into the nature of the different weeds here, but it may be stated briefly that they all come within three classes: plants that live for one year, those that live for two years and those that live for many years. According to their nature these different weeds can be controlled, and it is only by having this knowledge that we can get at a practical remedy. The statement I think can be made that there is no weed known, whether native or introduced, which cannot be controlled by putting this knowledge of the habits of the plant to use, and by the ordinary methods of good farming.

VALUE OF SHORT ROTATION OF CROPS.

One of the methods which has been found of the greatest use is the adoption of a regular short rotation of crops. In this way the land is maintained in fertility, it gets the proper amount of ploughing and harrowing to hold in moisture, and at the same time weeds are destroyed or prevented from increasing. An excellent plan is to use a three or four year rotation; seed down with grain, using plenty of grass and clover seed the first year, take hay and pasture the second year (or second and third year), plough up the sod in August, keep clean till winter, and the next spring sow to corn or roots. Such a rotation will clean land of the very worst weeds, as we have found at the Experimental Farm under Mr. Grisdale's management. Among the weeds that he has conquered in this way, I might mention the Perennial Sowthistle, with a deep running rootstock and producing an enormous quantity of seeds. Some weeds require special treatment, but with a regular short rotation land can be kept clean of most of the weeds that give farmers trouble. The Perennial Sowthistle I have mentioned is one of the very worst weeds, but Mr. Grisdale has found at the farm that with a three or even a four year rotation land can be cleaned of it thoroughly.

THE FIELD BINDWEED.

The Field Bindweed, which is a most incredibly persistent enemy, when once it gets established, is a deep-rooting plant with fleshy rootstock which breaks up when land is ploughed and every piece of it grows. This weed is by far the most difficult to eradicate that I know. The best remedy we can apply is a short rotation, with extra harrowing in hot weather, together with the introduction into the rotation of summer fodder crops, such as pease and oats to be cut for feed and fodder rape.

COUCH GRASS OR QUACK.

A weed which is frequently inquired about from all provinces in the Dominion is Couch Grass or Quack Grass. This is supposed by many to be the worst enemy the farmer has to deal with, but really it is not such a bad enemy after all. If only one will study its habits of growth he will be able to understand this. The Quack grass does not root deeply in the soil, but very near the surface; therefore shallow ploughing is the best means of destroying it, by throwing up the roots to the surface, so that they may dry out in the sun and air. Deep ploughing, which is frequently tried for Quack grass, merely replants it, and actually does more harm than good.

SWEET GRASS.

The Sweet Grass of the Northwest, on the other hand, which unfortunately is often spoken of as Quack grass, is a deep-rooting weed, and therefore cannot be stamped out in the same way as Quack grass, and, if the directions given for Quack

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grass, viz., to plough shallow, were followed, this would have the effect of increasing its vigour and making it worse than before. As a general principle deep-rooted perennials must be ploughed deeply in hot weather, so as to break up as much as possible their root system; after this, all leaves (which are their only means of feeding), must be prevented from forming by the frequent use of harrows and cultivators.

ENGLISH GROUNDSEL.

Some member of the committee inquired the other day about the English groundsel. I think it was a Nova Scotia member who made the inquiry. Mr. Clarke asked me to speak of it to-day. I may say that this is an annual weed which has been introduced into the lower provinces and is abundant there in many places. It also occurs occasionally in gardens through Ontario, being introduced, in such cases, with garden seeds from Europe; but it is unknown to farmers, as a rule. It occurs injuriously in British Columbia, where the conditions are somewhat similar to those in the maritime provinces. Being an annual weed which seeds abundantly, when it finds favourable conditions it spreads rapidly; but the remedy is a very simple one—keep the land thoroughly clean early in the season and after the crops are off in autumn. By this means it can be easily held in check if recognized and attended to. Weeds, like some insects, may increase unduly where they have not been recognized as enemies by farmers, until they become such pests that special measures must be taken to control them. Whenever reasonable treatment founded on the nature of the plant is given, every weed I know of must disappear.

By Mr. Wilmot :

Q. What is the appearance of the Bindweed?

A. It is like a small Morning Glory with a flower about as big as a twenty-five cent piece, pale pink and sweetly scented. The stems are low and slender and the leaves are arrow-head-shaped.

By Mr. Derbyshire :

Q. You seem to make light of this Couch grass. It is not so easily got rid of as that up our way.

A. I believe you tried some experiments in burning it?

Q. I had a gentleman tell me that he gathered the weed with his hands and burned it, and the ashes grew.

A. My friend, Mr. Derbyshire, told me this story some years ago and asked me what I thought of it. I said his friend had probably made a mistake.

WILD CARROT.

By Mr. Pickup :

Q. Do you know anything of the Wild carrot in Nova Scotia?

A. Do you refer to a plant with a white flower, or a yellow one? There are two plants sometimes spoken of as Wild carrot.

Q. No, a white flower.

A. That is the true Wild carrot. It is a bad weed in some places, particularly in old hay meadows.

Q. It has a long big root?

A. Yes, a deep tap root, but it is only a biennial, that is, each plant lives for two years only; and this must be remembered when devising means for destroying it.

Q. It gives trouble in pastures.

A. It is a biennial weed. Each plant just lives for the two years.

Q. This has been living for five or six years.

A. It may have been there a great many years; but undoubtedly each plant only lives for two years, but probably fresh seeds germinate when the land is broken up,

or some fresh seeds may form every year on dwarfed plants or cut off stems which often throw up small shoots late in the year. Breaking up the meadows and re-seeding would soon clean them.

By Mr. Clements :

Q. What is the life of the Canadian thistle ?
A. I am afraid I am not old enough to answer that question, it will live a great many years if left undisturbed.

WILD MUSTARD.

By Mr. Finlayson :

Q. A weed you have not touched upon is the wild mustard.
A. In which province ?
Q. It is all through Ontario.
A. In Ontario the most practical treatment for wild mustard is undoubtedly spraying it when in flower, with a solution of bluestone in water, 10 lbs. of the former and 50 gallons of the latter. That will destroy every plant it touches, and will cost from 80 cents to \$1 an acre.
Q. At what season ?
A. Just when the flower is opening and the fields are beginning to look yellow. The mixture will not affect the crop amongst which the mustard is growing, and every mustard plant will be destroyed that the bluestone spray falls upon. In the Northwest this is not a practical remedy because fields are very large and water is sometimes hard to get conveniently. A more practical remedy, there, is harrowing grain crops after they are well up—the plants being about 3 inches high. Harrows and weeder of course cannot be used when grass and clover have been sown with the grain.
The following are among the most satisfactory formulæ for making the

LIME-SULPHUR WASH FOR SAN JOSÉ SCALE AND FUNGOUS DISEASES.

- 1. Lime. 12 lbs.
- Sulphur, powdered. 12 “
- Water to make. 40 gallons.

Slake the lime with only enough water to do it thoroughly. Add the sulphur by dusting it over the lime while slaking; stir well and boil for at least an hour, adding only so much hot water as is necessary for easy stirring. When thoroughly cooked, strain through sacking, and apply hot.

2. Or the following, which is highly recommended by Mr. George E. Fisher, of Freeman, Ont.:—

- Sulphur. 20 lbs.
- Lime. 30 “
- Water to make. 40 gallons.

3. Cook sulphur washes in iron pots or by steam in wooden vats or barrels; never use copper vessels either for cooking or for spraying sulphur washes from.

Having examined the preceding transcript of my evidence, I find it correct.

JAMES FLETCHER,
Entomologist and Botanist to the Dominion Experimental Farms.

TOBACCO GROWING IN CANADA.---AVAILABLE MARKETS.

HOUSE OF COMMONS,

COMMITTEE ROOM 34,

WEDNESDAY, March 27, 1907.

The Select Standing Committee on Agriculture and Colonization met this day at 11 a.m., Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—As you all know from the notice we received, we are to hear an address to-day by Mr. Felix Charlan, of the Department of Agriculture, on the subject of 'The Growing of Tobacco in Canada.' I have much pleasure in introducing that gentleman.

TOBACCO CULTURE IN CANADA.

Mr. CHARLAN.—Mr. Chairman and Gentlemen,—In July, 1905, I learned that the Dominion government desired to secure the services of a specialist in tobacco culture, who should look after the interests of that industry in Canada, giving his whole attention to production and the relations between grower and manufacturer.

The intentions of the government, and the offer of the position, were kindly communicated to me by the Honourable Mr. Brodeur, and I gladly availed myself of the opportunity to devote my energies to the welfare of the tobacco industry in Canada.

I arrived in Canada in the latter part of October, 1905. Believing that my first duty was to make a careful investigation of the conditions of the industry, in order to be in a position to indicate such improvements in the growers' methods, as I might consider necessary to render cultivation more productive and more profitable, I immediately started upon an inspection trip. In the course of this trip, I was much impressed with the national importance of an industry which, although still in its infancy, had already acquired considerable growth. I made notes of the different varieties cultivated, and of the various methods of cultivation, in both Ontario and Quebec.

My conviction, at the conclusion of the trip, was that Canada should easily supply a large proportion of the tobacco required for home consumption. This conviction has been amply confirmed by subsequent thorough examination of Canadian tobaccos, as well as by the different experiments in growing and fermenting which I carried on during 1906.

At the present time, the production of tobacco in Canada is limited to two large centres, which may be separately considered.

1ST. THE QUEBEC CENTRE.—There, the growing industry is confined chiefly to the counties around Montreal, and particularly those on the north shore of the St. Lawrence, that is, L'Assomption, Berthier, Joliette, Montcalm, Two Mountains, Rouville and Beauharnois.

2ND. THE ONTARIO CENTRE.—At present in this province the production is confined to the counties of Essex and Kent. But it may be rapidly extended, in the light and rich soils abundant upon the north shores of Lake Erie and Lake Ontario.

Strictly speaking, the aim of the Ontario grower is, already, to meet the requirements of the manufacturer. There are several varieties under cultivation in Ontario, but of these the 'Burley' variety constitutes the larger part of the total output of the

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province, and for it there is an established, good and steady market. The 'Burley' is of a rather thick texture. It requires a fairly long summer for its ripening, and above all a favourable fall, to cure properly. The southern part of Ontario affords these climatic requirements in a remarkable degree.

CHARACTERISTICS OF VARIETIES OF TOBACCO LEAF.

The 'Burley' variety is chiefly used in the manufacture of chewing tobacco—in plugs and other shapes—and the Ontario growers have of late considered the adoption of other varieties, suitable to the production of smoking tobacco, in view of the contingency of over-production of 'Burley' and a consequent decline in prices. The growers should certainly feel safer in taking up the cultivation of other varieties for which there is a demand at the present time, especially in eastern Canada. It is possible that this departure may bring the Ontario grower into direct competition with the Quebec grower, thus making the situation of the latter seem less secure. But the contingency of such competition is remote for it yet remains to be shown that smoking tobacco grown in Ontario possesses the qualities characteristic at the present time of the product of the province of Quebec. Moreover, the proximity of the centres of production to great manufacturing centres is an important element of success in this industry, and this element is one which must obtain for a long time in favour of the Quebec grower.

CHARACTERISTICS OF THE ONTARIO TOBACCO CROPS.

It is comparatively easy to define the characteristics of the Ontario crop, not so with the Quebec crop.

In Ontario, with few exceptions, we find perfect co-operation between the growers and manufacturers. This has made it possible to settle in a general way upon the variety or varieties to be grown to best meet the demands of the trade. In Quebec, on the other hand, there would appear to be considerable guesswork in the selection of varieties. A very large number of varieties are being cultivated, and many of them are far from being pure. They are tried in turn by the farmers, with alternating success and failure, according to the fluctuations of an irregular market, which is partly controlled by small dealers and sometimes even by the farmers themselves—the leaf tobacco trade.

However, some of these varieties are fated to disappear, and particularly such as the 'Burley' and 'Blue Pryor,' which yield a thick texture tobacco, ripening rather late. With the limited equipment which the Quebec growers at present possess, and on account of the possible shortness of the season of fine and mild weather after harvesting time—that is, about September 15—the varieties referred to are hard to cure. Still another variety which requires the limit of time of growth is the Connecticut Seed Leaf. On account of its fineness and silkiness, this variety is highly appreciated in the manufacture of cigars, but as it ripens late, it is exposed to the danger of fall frosts, which may occur before the time of harvesting it. Perhaps we shall be able to successfully grow this variety, if we can induce the growers to set their plants out as early as possible.

As to the varieties called Havana (large and small), Comstock, Spanish and Canelle, they are worthy of close attention. They ripen comparatively early, and yield an aromatic tobacco which, if well cared for, should meet the requirements for filler or binder in the manufacture of domestic cigars.

ERRORS IN PREPARATION OF TOBACCO FOR MARKETING.

It can be truly said that, so far as the tissue and the aroma are concerned, most of the Canadian tobacco presents distinct qualities. But there are also some defects, and these should not be concealed. They may be attributed to three chief causes :

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1. The haste with which some operations are performed, and the entire lack of grading.

2. *Errors in cultivation.*—Some varieties, of which the Connecticut is an illustration (a particularly light and fine tobacco), have been grown with a view to obtaining a heavy yield, thus causing a deformation of some of the most advantageous types.

3. Insufficient curing in some parts of the tobacco districts, and lack of care in the keeping over of the products and in the preparation for the market.

It cannot be doubted that marked and rapid improvements may be obtained. Already an active educational campaign has been started, in order to lay before the farmers, full and definite information in regard to the selection of the most profitable varieties and the means by which these may be grown and cured with the greatest possible degree of success.

Immediately after visiting the tobacco districts, I made arrangements for a series of lectures, in order to personally lay before those interested the substance of my observations, as well as the changes in methods which I deemed necessary to improve the situation. These lectures were given during the winter; advantage being taken of the meetings held in the tobacco districts by the delegations of other lecturers from the Department of Agriculture, who lectured on other agricultural topics.

These tobacco lectures dealt particularly with the following phases of the subject :

1. Necessary precautions to reduce to a minimum the production of low class products.

2. Best methods of culture, according to the variety, in order to obtain best possible cash returns, while keeping up at the same time the soil fertility.

3. General conditions governing the market, and the best way to take the fullest advantage of these conditions.

The suitability of the different varieties grown in the various districts have also been a subject of consideration.

It was decided to submit one of the Wisconsin varieties to a trial in Canada, and to this end a distribution was made of seed.

At the same time a beginning was made in the publication of a series of practical bulletins on the growing and handling of tobacco, of which two have already been issued and distributed. The first of these bulletins deals with hot beds and seedlings, calling the attention of the grower to the necessity of sowing on the hot beds in order to obtain plants suitable for setting out as soon as the land can be brought into proper shape. The purpose of the second bulletin is to correct certain mistakes in the use of commercial fertilizers; mistakes which in some cases have been the cause of the production of incombustible tobacco or of tobacco with a poor quality of tissue. These two bulletins deal only with general subjects, and I was therefore able in a short space of time to prepare them for publication. Before issuing further bulletins, I desired to make myself thoroughly familiar with the various conditions governing the industry in Canada, and to learn the needs of the growers, so as to be able to give instruction and information along the exact lines required.

Meanwhile, however, in order to deal with the most urgent needs, and for the benefit of those farmers who had not been able to attend the winter series of institute meetings, a series of articles was prepared for the agricultural press of Ontario and Quebec. These articles dealt in a general way with the care to be given to the crop, from the time of setting out the plant, to the delivery of the products to the merchant or manufacturer. They were prepared from time to time, and sent out at intervals to the agricultural press, as stated, as well as to a number of daily papers of the two provinces.

AN EXPERIMENTAL TEST OF FERMENTATION.

During the winter of 1905-6, an experiment in the fermentation of Canadian tobacco was undertaken, with products grown in the Montcalm district. A decided im-

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provement was noticable in the quality of the tobacco after being submitted to this process. No doubt we are still very far from perfection, but still enough has been accomplished to favour the repetition of the experiment, and to give us good hope of arriving at a satisfactory solution. When the experiment was concluded, some samples of the product, both in the shape of smoking tobacco and cigars, were distributed throughout the country for submission to the judgment of the public, to make Canadian tobacco known in a form not hitherto put upon the market. Some of the fermented tobacco, in leaf form, was also sent to the Canadian cigar manufacturers. The general opinion was that this tobacco was a little too strong, and in some cases too thick. The aroma and the taste, however, were pronounced of a sufficiently high standard to give us the hope that, at some future time, a good proportion of it will be used in the manufacture of domestic cigars. But it will be necessary to modify the methods of growing in order to obtain a lighter leaf.

A large sample was sent to France, to be submitted to the judgment of the experts of the tobacco administration. It was found worthy of consideration. The tissue was said to be of good quality, sometimes rather thick. The aroma was not judged to be sufficient for an exotic tobacco, and the taste was found slightly bitter and flat, though not disagreeable.

It should be mentioned in this connection that the tobacco submitted for trial was still young, and would doubtless have improved with age, after undergoing the ripening which takes place in packages.

The tobacco experimented with belonged to the Comstock Spanish variety, the products of which have a rather pronounced taste of the soil. There can be no doubt now that a lighter tobacco would have been obtained with the Connecticut variety, and a more aromatic one with the Havana Seed Leaf; but the Comstock variety was selected on account of its earliness, a precious quality with the climate of the province of Quebec.

In further experiments, the process of fermentation will probably be modified, as it is believed that a more intense fermentation, would give a milder product, less intoxicating, and with a better aroma. This question of fermentation now remains with the Canadian manufacturers. They will doubtless take up the process as soon as the conditions are more favourable.

EXPERIMENTAL STATIONS. TO ILLUSTRATE THE GROWING OF TOBACCO.

We also undertook an experiment in the growing of the variety Comstock Spanish, and for this purpose some samples of the seed of this variety were distributed among the agricultural clubs in the tobacco districts.

Introduced during the preceding year, this variety had generally met with favour, and it was proposed to submit its value to a thorough test, and to ascertain as nearly as possible what it could yield in the hands of Quebec farmers. The clubs to which seed has been forwarded have been asked to report on the results obtained. So far, the few reports received are favourable, but we prefer to wait for further information before endorsing the use of this variety.

Arrangement was also made for the establishment of illustration stations, both in Ontario and in Quebec, in order to illustrate the superiority of particular methods of growing tobacco, with a view to obtaining a greater yield in weight, a fineness in light varieties, and to ultimately reduce the exceedingly high percentage of quantity of inferior products.

These experiments were partly spoiled by a prolonged drought and the only really successful plantation is situated outside of our official radius. It shows in a conclusive manner the merits of the Comstock, so far as earliness is concerned, and the superiority of close planting in order to obtain fineness of products and a heavy yield in weight. However, these data are only the result of the estimate made in the field, and such is always largely approximate. Complete data will be secured from the farmers at the end of the curing period.

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In order to check the data obtained from the growers who were entrusted with these experiments, a similar experiment was also carried on at the Central Experimental Farm. The tobacco secured from the latter has been sold to a Canadian manufacturer, in whose establishment it is being treated at the present time.

Such, Gentlemen, is the account of a year's work. Devoted chiefly, as you will have observed, to a study of the conditions governing the tobacco industry in this country; and this study has left me little time for experimental researches. I wish now to dwell more at length upon certain features of the industry in order to give you a clear idea of its future.

THE PROSPECTS FOR A FUTURE TRADE IN TOBACCO.

In Ontario, the outlook is very promising, the Burley variety which forms the base of the production, gives products eminently suitable from manufacturing point of view, and yields large returns to the grower. The production is continually increasing, limited so far only by the home consumption. The latter is still comparatively small. But it may safely be predicted that its increase will be more than proportionate to the increase in population of Canada, as most of the adult immigrants use tobacco.

Probably before a long time the Ontario growers will also take up the growing of some varieties of smoking tobacco, and by so doing will be able to increase the area devoted to the cultivation of tobacco, even before the consumption of Burley increases; but I do not think the Quebec grower need worry over this prospective competition.

The situation of the Quebec grower is also satisfactory. Cash returns for the crop are generally good. However, it may be well to state in this connection that these returns are based upon rather high prices, not always justified by the quality of the products.

The leaf tobacco trade is responsible for this state of affairs. Both the consumer and the grower are, in a certain measure, benefited by this trade: the consumer because it enables him to get tobacco at a much lower price than he would have to pay for a good manufactured brand, for this low-priced product is unfinished and very often of poor quality; and the grower because he secures thereby a rather high price for a product to which, in many cases, he has given very little care. But it is obvious that the Canadian manufacturing industry is severely handicapped by this state of affairs, and the development of our tobacco trade suffers in consequence, because the wide distribution of our products throughout the Dominion, and the increase in the home consumption of these tobaccos, depend entirely upon the efforts of the Canadian manufacturing industry.

The marketing of fairly large crops at the right time is often a matter of considerable difficulty with the Quebec growers. No manufacturers or agents make any offer to buy until the prices have suffered a sharp decline, and the owners of the crops have to wait until such a time, or else dispose of their products in small lots to the retail trade. Meanwhile, they suffer considerable loss and run the risk of injuries to the tobacco to which it is subject if held over the winter season.

I venture to make the assertion, that some of the varieties grown at the present time in the province of Quebec will probably constitute the basis of the home industry, in smoking tobaccos and domestic cigars. However, under the conditions actually prevailing, products of superior quality are rather scarce, or at least are lost sight of in the bulk of ordinary products. Therefore, when such products are to be met with, only by accident, it is rather a difficult matter to make a strong case in favour of the quality of our tobaccos.

For some time past, a few progressive manufacturers have made use of Canadian tobacco in the manufacture of cigars. I had the opportunity of testing some of these trial cigars, and I must say, that, so far as lightness, fineness of aroma and combustibility are concerned, they left nothing to be desired; and they were certainly far superior to some brands, bearing the label of imported tobaccos, which are offered on

the market at the present time. With new tariff conditions, or legislative measures, we may hope to see a rapid growth of all branches of the Canadian tobacco industry, and then we shall be able to give the farmer more definite instructions in regard to the most desirable varieties.

REQUISITES TO RAISING THE STANDARD OF TOBACCO LEAF.

For the future, it seems desirable that the following programme be carried out:—

1. Improvement of local varieties by good methods of cultivation. Selection may play an important part in this work; but in some cases more rapid results will be obtained by going back to the original types of the variety and distributing the seeds of the best of them throughout the country, care being taken to acclimatize them, under such conditions that they may retain all of their desirable characteristics.

2. Adaptation of desirable foreign varieties especially with a view to supplying products suitable for the manufacture of cigars. Havana seed is desirable, whether for fillers or binders; and Connecticut for binders. It will be necessary to closely watch the evolution of the varieties under the conditions of our Canadian climate and endeavour to 'fix' their characteristics when they are in a proper condition to be utilized by the local manufacturing industry. This work will chiefly consist in the acclimatization of the purest possible foreign varieties, and the distribution of the latter, in the districts affording the best and most suitable soil and climatic conditions.

Part of our work should also consist in endeavouring to provide the Canadian growers with varieties combining both qualities of earliness, and suitability for manufacturing purposes. The two conditions are indispensable, in order to insure regular and sufficient returns to the Canadian grower, as well as a regular supply of suitable products to the Canadian manufacturer. This work will be done by following the various processes of selection and hybridization. Such operations are rather delicate, and may require a long time. In undertaking them we shall be guided by successful experiments, lately carried out in other countries.

It will also be necessary to carry on an educational campaign, in order to give the growers instruction on the following lines:—Care and management of the different varieties, so as to secure them in the best possible condition; adoption of rational methods of cultivation in order to increase the yield in weight per acre (much too light in certain districts) and improve the general quality of the products; keeping up of soil fertility. In certain districts, the attention of the growers will have to be called in a special manner, to the danger of exhaustion of the soil, exhaustion which has already manifested itself at some points, and which might seriously affect the tobacco industry.

It is to be expected that the production of tobacco in Canada will not remain confined to the districts where it is located at the present time. Numerous requests for information show that it is being tried in other parts of the country. Every day new districts of more or less importance are being discovered and out of the number some will certainly be found offering conditions as favourable to the success of the industry as in those districts where it had its first start. We may also expect, unless the increase in consumption is extraordinarily rapid, to see the growing of tobacco carried on upon a smaller scale than heretofore by the different growers. More intensive and better cared for cultivation will mean a heavier yield to the acre, a better quality of products, and will leave the land in better condition, as it will render possible the adoption of a rotation and the more frequent use of manures.

IMPORTANCE OF ILLUSTRATION PLOTS.

It is also part of our programme to establish illustration plots in both of the provinces where the production of tobacco is centralized. These plots will have a two-fold object: in the first place, they will enable the growers to see with their own eyes the results secured by the methods which we recommend and thus the merits of the

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latter. In the second place, they will afford us valuable information as to the value of some varieties in the districts where the plots will be laid out.

A great advantage of illustration plots is that they may be laid out in any district where educational work is needed, and removed from point to point as necessary. They enable us to bring education home to the farmer, in the most economical way possible. It will also be advisable to endeavour to localize the growing of certain varieties so as to establish a reputation for the tobacco of each district. With the increased facility for long distance transactions, and the grading of the products, this reputation should contribute powerfully to the prosperity of the different tobacco growing centres of the Dominion, really worthy of their name.

In this address I have thought it advisable to define clearly the rather sharp lines of distinction between the Ontario crop and the Quebec crop, but it may be well to point out in this connection that this comparison does not, in any way affect the quality of the products. When the nature of the products is different, as in this case, no comparison can be made with fairness.

So far as money making is concerned, the growers are doing equally well in both provinces ; and in that connection the best growers in Quebec have no reason to be envious of the most skilful growers of Ontario.

CO-OPERATION BETWEEN GROWERS AND MANUFACTURERS.

However, in certain parts of the Dominion, the industry suffers from a lack of co-operation between growers and manufacturers, and great progress will be made, when normal relations exist between the two parties.

The manufacturers' part, in the economy of the tobacco industry, is to prepare the products and send them to distant markets, and direct the excess of production, of a certain district, towards a less favoured and non-productive centre. But, to perform this part efficiently the manufacturer must be able to depend upon a regular supply of products suitable for his purposes, and readily available. To meet these requirements must therefore be the grower's aim. By so doing he will gain a better and steadier market, and at the same time remove the risk of local congestion which may happen in some districts, not on account of a deficiency in the quality of the product, but on account of a lack of proper understanding or co-operation between grower and manufacturer.

Mr. Ross (Yale and Cariboo).—We are all intensely interested—and particularly those identified with tobacco culture—in this very valuable paper which has just been presented to us ; but Mr. Charlan should not have made the mistake that a great many people make of treating the provinces of Ontario and Quebec as the whole, or the most important part of Canada. He is an officer of the Department of Agriculture, and he ought to know that the province of British Columbia produces tobacco to-day such as cannot be grown in the provinces of Ontario and Quebec ; tobacco equal to anything that is grown in the United States, and equal to anything that is produced outside of Havana. Mr. Charlan should make a note of this, and when he establishes illustration stations in Ontario and Quebec, to encourage the production of tobacco, he ought to remember the large and promising field for tobacco cultivation in the province from which I come ; larger, in fact, than in either of the other two provinces named, and not forget British Columbia, where tobacco is grown that can be smoked with a great deal of pleasure.

Mr. BLACK.—I hope that the experiments of Mr. Charlan will extend as far as Nova Scotia. It has long been the opinion of agriculturists in that province that there are many parts of Nova Scotia where the soil is particularly rich and adapted for the growing of the tobacco plant, and I would like to have that tested in some way or other, either at the Experimental Farm, or on some of the areas I referred to. There are large areas in the counties of Cumberland, Hants, Kings, Annapolis and Colchester, upon which ever since the 17th century crops of English hay and grain have been grown without a pound of fertilizers ; some of them for over two hundred years, some

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for one hundred and fifty years, and some for one hundred years. We have an idea down there that the soil in the districts mentioned is particularly adapted to the growing of the tobacco plant, and I would like very much if some experiments were made along that line.

Mr. CHARLAN.—I am quite aware of the development of the tobacco industry in British Columbia. I have seen samples of tobacco grown in that province which were of excellent quality, and I think that part of Canada is one of the most promising for the tobacco industry. It so happens, however, that the provinces of Ontario and Quebec have taken most of the comparatively few months that I have been in Canada. In the limited time at my disposal, I could not spare the fifteen days which a journey to British Columbia and back would occupy ; but I hope to visit that province in the near future. As to the province of Nova Scotia, I am quite prepared, with the consent of the minister, to undertake experiments in the growing of tobacco there. I am doubtful, however, whether it would be possible to raise good tobacco in Nova Scotia, for the reason that tobaccos grown in the neighbourhood of the sea do not appear to have the necessary combustibility. They do not appear to burn as well as they should to be classed as good tobaccos. This defect is due to the presence of saline compounds, with chlorine as a base, in the atmosphere and in the land.

So, far, I have been giving my whole attention to smoking tobacco, because I find that variety requires more care than chewing tobacco. The chewing tobacco industry has already been well established in the province of Ontario by the cultivation of the Burley variety ; but a great deal remains to be done, in the direction of improving the quality of smoking tobaccos, especially in the province of Quebec. For this purpose we need chiefly lighter tobaccos. However, the work which has been done already has given good results, some manufacturers having observed quite an improvement in the tobacco brought to the market ; and it would seem that there is an increase in the proportion of light tobaccos.

We cannot think of exporting our tobacco to France or to any other country just now, because it is not possible at present to compete with American tobaccos. Higher prices are paid in Canada for unprepared home products than the United States can secure for export tobaccos, which have received special treatment in order to meet the demands of the trade.

Mr. BERGERON.—I don't think you intend to convey the idea that Canadian tobacco is of a cheaper quality than the American, but that it is sold cheaper ?

A. American tobaccos are sold in France in large quantities, although some are found to be rather strong in flavour. An expert there assured me that if we could supply lighter tobaccos from Canada, at a reasonable price, a large market would be open to us. This American tobacco, however, sells in France at from 9 to 10 cents a pound ; whereas our Canadian tobacco, although not so suitable for foreign market under its present conditions, brings a higher price at home ; so that competition is impossible.

GRADING OF HOME-GROWN TOBACCO LEAF.

Mr. CLARKE.—Is that in the leaf ?

A. In the leaf. What we can do, is to grade our tobaccos. At present they are not graded. The first grade should be supplied to manufacturers for the production of domestic cigars and smoking tobacco. The second grade could be exported and sold on foreign markets for special uses for the same price as some American tobaccos—similar to ours in some respects—sell for to-day. We could easily export five or six million pounds. This is nothing, compared with the quantity imported by France, which amounts to over fifty million pounds annually.

What is wanted in connection with the great tobacco industry to-day is to establish a regular market. Some Quebec growers keep their tobacco for far too great a length of time. I have visited some growers who had kept their crop of 1905 until the month

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of March or April, 1906. The quality is liable to be injured when tobacco is kept for that length of time without special care. It will be far better to sell the tobacco early, before winter, if possible. This could best be done by the grower acting in co-operation with the manufacturer, the former endeavouring to supply the right quality of tobacco.

Mr. BERGERON.—Are we to understand that the American tobacco which sells in France for nine and ten cents a pound is inferior to our Canadian tobacco ?

A. The tobaccos exported from the United States meet some requirements of the foreign markets, and they are prepared specially for export. The tobaccos offered for sale by the Canadian farmers contain a heavy proportion of products of inferior quality which should never be placed upon the market. An endeavour should be made to reduce that proportion as much as possible. However, such as it is, this tobacco sells in Canada for a higher price than the average quality of American export tobaccos. And yet, with better care in the growing of the tobacco, still higher prices could be obtained on the home market. For export, it will be absolutely necessary to do some grading. Then, the best quality would be sold on the home market at as high a price as possible, and the second and third grades could be exported at satisfactory prices.

Having examined the foregoing transcript of my evidence I find it correct.

FELIX CHARLAN,

Specialist in Tobacco Culture, Department of Agriculture.

PROGRESS OF AGRICULTURE IN CANADA.

HOUSE OF COMMONS,

COMMITTEE ROOM 34,
Wednesday, February 6, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 10.30 a.m., Mr. MacKenzie, Chairman, presiding.

Dr. WILLIAM SAUNDERS, C.M.G., Director of the Dominion Experimental Farms, was present by request of the Committee, and addressed the members upon 'The Progress of Agriculture in Canada and the Extension of the Experimental Farm System,' as follows:—

Mr. Chairman and Gentlemen, the subject, I believe, which is on the Order Paper for me to speak to you on, is the 'Progress of Agriculture in Canada and the Extension of the Experimental Farm System.' Since the work of the Experimental Farms first began in Canada in 1886, twenty years ago, great changes have taken place in farming in this country, also in the relative position which the farmer occupies in the community. At that time farming was looked upon as a sort of drudgery which was all very well for dull, slow-going people, but those who had education and skill were generally advised to adopt some other occupation. Now, that has entirely changed, and there is no man who undertakes farming who can bring too much information to bear on his work. The farmer needs all the training and skill he can get to enable him to make his work successful, and the farming industry now engages the attention of a large proportion of the most intelligent people in the community.

In the early days of farming in Canada, it was very fully recognized that one of the great drawbacks to the farming occupation was that the farmer himself was not sufficiently educated, that he had not enough skill to carry on the many lines of work which devolved on him as a farmer, with advantage and with profit. There was then no Department of the Government or other institution, to which the farmer could appeal when he was in difficulties or desired to find out what course he should take to overcome these adverse conditions.

THE EXPERIMENTAL FARMS AS SOURCES OF INFORMATION.

After the establishment of the Experimental Farms this was changed. The Experimental Farms became bureaus of information to which the farmer could apply in cases of difficulty, and where he could get such help as it was possible to give in the way of information. In 1889—that was soon after the farms were established—it took about two years to select the farms and to put up the buildings and to get into operation; but in 1889, the first year in which we may consider they were fairly at work, the correspondence aggregated 8,000 letters in all. During the past seven years there has been an average of 68,797 annually, showing the wonderful growth which has taken place, and the freedom with which the farmers make use of these institutions for their advantage.

On the farms experimental work is being conducted continually, and at the close of each year the Annual Report, which is full of information, for the farmer is pre-

pared. Besides the Annual Report, occasional bulletins are published (of which I have brought a few samples) dealing with special subjects. The edition printed of all these publications now is 64,000. We have a permanent mailing list of about 62,000 Canadian farmers, and we have a foreign list which uses up a large part of the remainder. About 1,500 are sent to foreign correspondents and to libraries in all parts of the world where these publications are in considerable demand. With our large correspondence and the issue of these annual reports and the bulletins from time to time, a constant stream of information is going out to Canadian farmers in every part of the country, and putting the bulletins and reports together, there are about 300,000 copies of useful agricultural documents sent out to the farmers every year.

It would be unwise to claim too much for the Experimental Farms. They were the first helpful institutions established by the government of Canada for the farmer, and hence have occupied a prominent position in the eyes of the public. Subsequent to their establishment, there have been a great many other departmental branches established which are exceedingly helpful to the farmers—there is the Dairying Branch, the Veterinary and Live Stock Branch, the Cold Storage Department, the Seed Division, the Fruit Division—these are all branches of the work in connection with the Dominion government—and then there is scarcely a province in the Dominion but what has done a great deal for the farmers of their own particular province, notably Ontario, which has its Agricultural College, its live stock associations, dairy-men's associations, fruit growers' associations, and its horticultural and agricultural fairs and institutions: all these have helped. Other provinces have followed the lead of Ontario, and Farmers' Institutes, which are really one of the most helpful of all the provincial institutions, have been established in nearly all the provinces. All these have been helping to build the farmer up and to relieve him from the condition of comparative apathy and dullness which existed twenty years ago.

Besides the help which has been given to the farmer in the way of information, the great improvements which have taken place in agricultural implements have helped him very much. Now he delegates a large part of the heavy labour, which he used to do himself, to the horses, and sits on the implement and gets through the necessary operations of cultivation, seeding and harvesting, with comparatively little labour for himself. Improved implements have also led to the more careful and better cultivation of the soil, so that the land has been more responsive to the efforts of the farmer, and has given him more abundant and profitable yields.

By Mr. Lewis:

Q. Do you have any more applications for these bulletins and reports than you are able to supply?

A. We usually have enough to supply individual applications, but occasionally applications are received for a considerable number of copies from Members of the House of Commons, from Senators, and other public men in different parts of the country, for them to distribute, but no provision has been made by parliament to supply these. Indeed, I do not think that much additional distribution in that way would be very judicious, for the reason that in many instances those copies thus sent from individuals would reach the same parties who have been already supplied direct from the farms on account of their being on our mailing list.

Q. I am referring to the mailing list, do you send to all on that list?

A. Yes.

Q. How old is that list?

A. It is being constantly revised. Every publication that goes out has a request on the envelope to the postmaster, that in case of the removal of the party to whom it is addressed, from the neighbourhood, or his death, or if the publication is not called for, to return it to the Experimental Farm, and if it is so returned, that name is removed from the list.

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Q. Is that request complied with, do they return the publications ?

A. Yes, they are quite frequently returned, when the name is at once erased. There may be individual instances where from oversight the postmaster may not promptly comply with our request, but, as a rule, it is very faithfully carried out. Then, we are always glad to supply any member who wishes to look over the mailing list in his constituency, with a copy of the list; and if he wishes, he can add a reasonable number of names to the list, which with the revision which is constantly going on keeps it pretty well up to date. Each edition of the publication is sufficient to meet the requirements of the mailing list and to leave a small surplus over, but not enough to enable us to send out and considerable number of copies to every applicant who may ask for them.

By Mr. Wright (Renfrew):

Q. The postmasters are only too glad to return the publications that are not called for or delivered, because they do not want to have them continually coming when there is nobody to take them?

A. I should judge, from what is sent back, that the postmasters are careful to comply with our request.

By Mr. Armstrong:

Q. Do I understand that the list made out some three or four years ago is still being used, that any one getting on the list three or four years ago is still being supplied with the publications ?

A. Yes, a farmer who has once got in touch with the Experimental Farms is exceedingly glad to be left on the permanent list. There are a limited number of copies sent out by members, and if a member applies for a few copies, we do the best we can to meet his wishes and send him whatever we can spare. Every year we have some applications from people who say, 'I got a report from you two or three years ago, but have not had one since, how is that?' They have the idea that the report in every instance comes from the Farm, and when members of the House of Commons send a report one year and do not continue sending to the same farmers, there is much disappointment. The reports are much appreciated by the farmers, everywhere, and we think that the best way to help them is to keep them in touch with us by supplying them with all the publications that are issued from the Farm. Hence the mailing list kept at the Experimental Farm is a permanent one, which is only altered by the removal or death of the individual.

By Mr. Lewis:

Q. What is the number of pamphlets that you issue in each year?

A. Over 300,000 a year.

Q. Is that number increasing?

A. Yes. I do not suppose there is a day in the year we do not add to the mailing list; it is increasing quite rapidly. The edition of each pamphlet or bulletin was a few years ago 50,000, but we have been obliged to increase the number from year to year, until it has now reached 64,000. This has been necessary in order to keep up with the increase of the mailing list, which is now growing from 1,000 to 2,000 each year.

Q. Do you mean to say that you publish 300,000 of each pamphlet or bulletin?

A. No. I mentioned just now there are 64,000 copies of each bulletin published.

IMPROVED METHODS IN CULTIVATION.

Among other things which have conduced to the advancement of the agricultural industry in the eastern provinces has been improvement in the management of the soil, the more general introduction of fall ploughing, which was scarcely practised at

all twenty years ago. This permits of early seeding, which is of great advantage and results in larger crops. Besides that there is the ploughing under of clover, which is much more generally practised than formerly, and other means which have been adopted to enrich the soil and bring it into a better condition of tilth. These have all been exceedingly helpful and have brought the crops of the eastern provinces up to a very good average condition, where they compare very well with similar crops in other countries.

COMPARATIVE ACREAGE YIELD OF CEREALS IN VARIOUS COUNTRIES.

I thought it might interest you, were I to give you a few figures showing how the main crops of Canada, taking wheat, barley and oats, compare with those of other countries, especially those countries which compete with us in the markets of the world. In Great Britain, which, although not a competitor, is a large buyer, the average wheat crop is 30.95 bushels per acre. In Ontario, the average of winter wheat is 22.50 and of spring wheat 18.92, showing that we are not, in this respect, so very far behind the mother country; France, which, although not a competitor with us, is often cited as a country of great progress in agriculture, averages 19.57 bushels, which is under the average yield for Ontario. Manitoba gives about 18.45, the Canadian Northwest, 19.13, while Russia in Europe gives an average of 9.05 bushels per acre, and the United States, 13.43. The Argentine Republic, which is now sometimes a keen competitor with Canada in the markets of the world, gives an average of 14.76 bushels per acre. Our Australian competitors that are sometimes cited as formidable, have very small crops: New South Wales has an average of 9.9 bushels per acre; Victoria, 7.18 bushels per acre; South Australia, 6.62 bushels per acre; West Australia, 11.51 bushels per acre; and Queensland, which, however, does not grow wheat very largely, 15.77 bushels per acre. Hence it will be seen that the average of the wheat crop in Canada is well above that of our competitors.

In oats, which is perhaps almost as important a crop with us as wheat, we have gone a trifle higher in Ontario than the yield in the mother country. Great Britain gives an average of 39.06 bushels per acre of oats, and Ontario gives 39.60 bushels. That is much higher than Ontario was twenty years ago, and the improvement in the method of farming, in the character and quality of the grain and the productiveness of the varieties, has been perhaps more remarkable with regard to oats than it has been with reference to any other grain.

By Mr. Blain:

Q. What is the fact—is the average increase in wheat and in other cereals greater in Ontario than it was ten or fifteen years ago?

A. The gain, I think, has been a steady one, although not very heavy. I will not say that it has occurred every year, but take five-year averages and compare them with the previous five years, and I think you will find that the gain is steady.

Q. Will that same answer apply to the other provinces?

A. We have not the same means of judging of their progress on account of their having no statistics except from the ten-year census, and if that year happens to be a bad year, as it sometimes is, it gives an unfair impression of the crops of the eastern provinces in the eyes of the world. With regard to the western provinces there is a gain, I believe, although the records have not been kept long enough there to enable us to compare them as in Ontario.

The oat crop of Manitoba averaged 38.60 bushels per acre in 1906, and for the Northwest it was 34.76; they all come up very close to the oat yield in Great Britain.

I might say that Great Britain has the largest average for wheat in the world, Germany coming next with 28.25, but in oats Germany, with 39.69 bushels per acre, does not go very much above the average in Canada.

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By Mr. Lewis:

Q. How are the States in regard to oats?

Q. The United States give 29.15 bushels as the average per acre from the whole country, as against 39.60 bushels for Ontario, 38.61 for Manitoba, and 34.76 for the Northwest.

By Mr. Wilson (Lennox):

Q. There are certain districts which are very well adapted for certain kinds of grain, which, if sown elsewhere, do not yield as heavily and thereby the average is reduced?

WINTER WHEAT VS. SPRING WHEAT IN ONTARIO.

A. Yes, that is a point well taken. In regard to Ontario the yield of winter wheat is 22.50 while that of spring wheat is only 18.80 bushels to the acre. If the winter wheat, of which we have much the larger area and which gives the higher yield, were alone considered, Ontario would make a better showing. These figures I have quoted from a recent report of the Royal Highland Agricultural Society in England, and I believe they are reliable.

By Mr. Lewis:

Q. Can you give us any comparisons regarding the quality of the wheat produced by these different countries?

A. The quality of the crop is not so easily expressed as the quantity. The quality of a wheat is believed to vary in proportion to the quantity and quality of the gluten it contains. In the Canadian Northwest the quality is of the very best, and the hard wheat grown there is much in demand for mixing with the flour of other sorts inferior in strength, so as to bring them up to a desired standard. The wheats of the Northern United States are also very good, and so are some of those grown in the northern parts of Russia. In most other wheat-growing countries the grain is more starchy in its character, and the quality does not rank so high.

With regard to oats, it is usually found that where the largest crops are grown, the oats are the finest and the plumpest.

Q. We had a statement made here by a gentleman the other day in reference to the quality of wheat when grown far north?

A. The quality, of course, varies considerably, but excellent wheat is grown in most of the northern parts of Canada. That, I presume, is a subject which will be taken up by the Cerealist of the Experimental Farm, who has paid special attention to that line of investigation and is more familiar with it than I am.

Q. It was stated by Professor Macoun that the farther north wheat grew, that same grade of wheat grew better and stronger than when grown farther south?

A. In a general way, that is probably true, but it would be difficult to prove or to disprove until we have had larger experience. Red Fife, which is without doubt our best wheat, and which ripens well over a large area in Canada, when taken far north does not always ripen. Take, for instance, the Peace River district, about Vermilion, where, last year, the crop of wheat amounted to about 5,000 or 6,000 bushels. They cannot ripen Red Fife wheat there successfully year after year, and are obliged to grow an earlier ripening variety. Many years ago, when the Ladoga wheat was first introduced, samples were sent up to that country, and their entire crop now is Ladoga, for the reason that it ripens a week or ten days earlier. This wheat is all used locally; none of it is shipped out of the country. If it were, it would command a price somewhat less than the Red Fife, as it is not equal to that variety in quality and the colour of the flour made from it is somewhat yellow. Hence the statement referred to would need to be discussed in connection with the possibilities of the several climates

for ripening the different varieties. It is possible that Red Fife, if it could be ripened there, might be better than if grown farther south.

Q. It was more in reference to the opinion that the farther north it would grow, the better it was?

A. I do not think that is quite proven, because we have found Red Fife grown at Ottawa to be sometimes better than that grown at Indian Head. That, however, is a matter the Cerealist will be prepared to discuss with you later on. We are trying, at the Experimental Farms, to subject everything, as far as possible, to test, and we have no proof as yet to fully substantiate this statement.

By Mr. Armstrong:

Q. Have you any new varieties of spring wheat to offer to the Ontario farmer in advance of what he has been using, varieties that have been fairly tested?

A. Yes, I think we have. The Preston is a very good wheat, and Stanley and Percy are also good varieties. The Pringle's Champlain is another promising wheat we have been testing in different parts of Ontario. All these are better than some of the wheats grown in Ontario, but these different sorts require further testing as to the quality of the flour for bread-making before their exact relative positions as to value can be determined.

Q. When the same grain is sown year after year, does it degenerate?

A. We have not found that to be so, when the soil is kept in good condition.

Five years ago we had over 70 varieties of wheat under test. The number under test in the uniform trial plots for 1907 will be 14. We have had to devote a great deal of time and labour to finding out the quality of these different kinds of wheat, with the view of growing only the best. We have now got through with most of that work. In the meantime, we have been cross-fertilizing and selecting, and have quite a number now of very promising varieties of wheat, among which there will no doubt be some that would be very useful in Ontario. It is, however, slow work, as a beginning must be made in each case with a single kernel. Then enough must be produced for grinding and testing the flour and baking bread, before we can ascertain whether the wheat is of a sufficiently high quality. We do not want to introduce wheats to general cultivation until we are thoroughly satisfied of their value.

Q. How long does that take?

A. Probably eight or ten years.

Q. That is a long time to wait?

A. Yes, it is.

Q. Do I understand that you have not been able, in the last eight or ten years, to give the farmers varieties in advance of those varieties which they had previously?

A. Yes, I think we have. During that time we have introduced several better kinds of early ripening wheats produced during the earlier experiments made eighteen to twenty years ago. There is no doubt we are making excellent progress in that line of work: there is no other institution in the world that I know of which compares favourably with the Experimental Farms in the amount of good work done in originating and introducing new varieties of grain. Canadian grain has a high reputation throughout the world.

TRIAL GROWING OF CANADIAN RED FIFE WHEAT, IN ENGLAND.

We have supplied the English Home Grown Wheat Committee with seed of the best varieties of wheat grown in Canada, with a view to introducing them generally into cultivation in England. They have wonderful success there in growing Red Fife. We were very fortunate in having had the Red Fife, which seems to stand at the head of all the wheats thus far tested, introduced early in this country. It has lately been shown from investigations made by the Cerealist at the Experimental

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Farm that the Red Fife is grown in Europe under the name of Galician Summer. It was accidentally brought to this country, where it fell into the hands of David Fife, whose name it took, and through his efforts it finally became generally known in Canada. The high quality of this variety in Europe, where it is known as Galician Summer, does not seem to have been fully recognized. The Red Fife sent from the Experimental Farm to the English Home Grown Wheat Committee has done remarkably well, and has been the means of calling general attention in Great Britain to the high quality of Canadian wheats. Only yesterday I received a copy of a letter which appeared in the 'Times,' calling attention to this matter.

By Mr. Wright (Renfrew):

Q. Is that the London 'Times'?

A. Yes, the London 'Times.' It refers to the Canadian wheat sown in Great Britain and to the experiments which have been tried by sowing that which is a spring wheat with us as a winter wheat there. It cites an instance of a crop that was sown at the rate of two bushels per acre in the last week of February, and although the soil consisted of little more than three inches of loam on the top of a chalk subsoil, the results exceeded the most sanguine expectations of the farmer who made the experiment. The crop yielded rather over 43 bushels per acre, weighing 65½ pounds per bushel, which is a substantial increase over the average crop of Great Britain of 30.95 bushels to the acre. The letter calls attention to the importance of going on with these experiments and of testing this most valuable wheat in a larger and more general way.

By Mr. Blain:

Q. Was the Red Fife wheat you referred to, introduced to the Canadian farmer through the Experimental Farm at Ottawa?

A. No. It was in 1842 that the first plant grew here from a chance kernel introduced with other wheat.

Q. I thought you were talking about some recent introduction?

A. No, the Red Fife was taken to the Northwest from Ontario by the early settlers in Manitoba.

By Mr. Lewis:

Q. What has been the experience with Red Fife in Western Ontario, in Middlesex and Kent, say?

A. The reports are conflicting; I think myself that any adverse reports are more often to be attributed to the quality of the seed than anything else. I see no reason, if the seed is good, why Western Ontario should not grow as good a quality of Red Fife as we grow in Ottawa.

HAND-PICKING SEED WHEAT.

By Mr. MacLaren:

Q. What about hand-picking the seed? Are you still picking the best kernels with which to make your experiments?

A. Yes, we are continuing that method and find that it works well. Take the Red Fife seed of commerce and you will find, when you pick the grains out, that in the same sample you have some Red Fife, some White Russian, and some White Fife, and sometimes other inferior sorts. A good deal of time has been given to the selecting of seed, so as to have it as pure as is possible. We have started as many varieties as we could overtake with these carefully picked pure samples, and begun their cultivation. We find that the Red Fife often has from 20 to 30 per cent of other kernels in it, as you find it in commerce. No grain-grower or seedsman will undertake to purify seeds by picking out the individual kernels, it will take probably a week of an

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expert's time to separate a sample large enough for one of our experimental plots; it is a kind of work that one cannot keep up for more than three or four hours a day; it is very hard on the eyes.

Q. It would not pay the farmer to do that?

A. He could not do it.

By Mr. Clements:

Q. With the climatic experience that you have, could you conscientiously recommend the farmers of the Kent district to grow Red Fife as a spring wheat; I might tell you this, that as far as my experience goes, there has been no spring wheat a success there within the last twenty years, except Goose wheat.

A. Where you can grow winter wheat as well as you do in Western Ontario, I do not think there is much use in advising the farmers to grow spring wheat. We have been carefully testing the Goose wheat of late and find it to be of very poor quality.

Q. I might say that Goose wheat produces fairly well to the acre, spring wheat produces more to the acre than fall wheat, and as the millers pay the same price for it, that is a good wheat to grow?

A. I am surprised to hear that spring wheat produces more to the acre than fall wheat with you, as this is contrary to the general experience of farmers. I do not think the millers will continue to pay the same for Goose wheat, when they find out that it is not of good quality.

TOTAL BUSHELS OF SPRING AND FALL WHEAT GROWN IN ONTARIO.

Q. There is not much spring wheat grown in Ontario?

A. The crop was a little over 3½ million bushels in 1906, against 18½ million bushels of fall wheat. This latter occupies much the largest wheat area in Western Ontario; it is also grown in Eastern Ontario, but is not a very great success there, as it often suffers from winter killing.

I have some further evidence to give you of the reputation that Canadian wheat has. A short time ago, the government of India corresponded with the Experimental Farms, and requested samples, good large samples, of all our best varieties of wheat to be sent there. The government of Japan, through their Chief Consul here, Mr. Nosse, sent a similar request. Another came from the Egyptian Soudan, requesting samples of those varieties of grain of high merit from Canada. Another request has since come from Italy, from the Minister of Agriculture there, and another from Mexico.

By Mr. Wright (Renfrew):

Q. Showing, at all events, that they know there is such a country as Canada?

A. And that it stands high among the wheat-growing countries for the quality of its grain, and for that reason they want to get these varieties to see if they can grow them of similar quality on their own soil.

By Mr. Blain:

Q. Are we to understand that this Red Fife wheat grown in Canada is a better sample now than it was twenty years ago?

A. That is a question one could hardly answer, unless he had a sample grown twenty years ago for comparison.

Q. There is a general impression among the farmers in my own district that it is a good plan to change seed every few years. It may be correct that wheat improves with constant growing, but, apparently, from what you say, the farmer, in doing that, is pursuing a wrong policy?

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A. I am not aware that I expressed any opinion on this point. There is a general impression of that kind prevailing, and it is very likely that there is truth in it, and that it is advantageous to change the seed from one locality to another; but any one who tries to prove it will find that he has a hard proposition before him. Where a farmer can change the grain he is growing for seed of better or purer quality, he will always find such change an advantage.

By Mr. Avery:

Q. What report have you received, or have you received any report, with reference to the wheat you have sent out to foreign countries as samples?

A. About five years ago we supplied the Home Grown Wheat Committee of the National Association of British and Irish Millers with Red Fife wheat, and they have sent us samples from year to year of what they have grown in England from the original seed sent from here. This year samples have been received of the fourth year's growth, which seem to be quite equal to the original wheat sent them four years ago. It was expected that in the climate of England it would deteriorate and become soft and starchy, but it has not; the sample sent this year is quite hard and semi-transparent and would grade well.

By Mr. Armstrong:

Q. Do I understand that you will advise the farmers of Ontario to leave off growing Goose wheat and advise them to grow Red Fife wheat?

A. We have to be very careful in what we advise the farmers to do.

Q. If it is best for them, you ought to do so.

A. We want the farmers in Canada to grow those crops which will give them the best returns. As long as winter wheat continues to give in Western Ontario nearly 5 bushels to the acre more than spring wheat, and the price per bushel is about the same for both, it is probable that he will grow that crop which will bring him the most money. The farmer is able to adjust his crop to his conditions. Winter wheat must be sown early in the autumn, and he may not have his land ready. The average farmer can be trusted to follow his own ideas as to what his own particular farm is best adapted for. If he were to undertake to advise farmers indiscriminately to follow a certain course, we might have them complaining that we were advising them contrary to their own judgment. I think the farmers of Canada, as a class, are as intelligent and have as much skill in the management of their land as any other farmers in the world, and while we are always glad to submit facts to the farmers, we prefer submitting results to them, and then let them adapt those results to their conditions in the way they think best, but not to lay down any hard-and-fast rules which may be all right in one case, and all wrong in another.

By Mr. Sproule:

Q. In localities where twenty-five or thirty years ago they could not grow fall wheat at all, it was all spring wheat. Conditions have changed rapidly, and now they are growing all fall wheat, and cannot grow spring wheat.

A. They are, I suppose, basing their practice on their experience.

Q. That is a well-known fact among farmers?

A. Yes, the increase in the area under winter wheat has been very large during the past twenty years.

By Mr. Clements:

Q. In the district of West Kent it is a well-known fact among farmers that no wheat is profitable to grow, as far as the price they receive for it is concerned. But we realize that we must have straw for the use of our stock, and many of our farmers are growing Goose wheat and oats sown together for feed. They find, and I have not had experience myself, but neighbours tell me, they get more feed from this com-

bination than from any other crop they grow. Have you any actual experience in the growth of these two grains together, and if so, what is the proper proportion to sow of oats and Goose wheat?

A. I do not think we have tried those two varieties in combination, although we have tried a great many mixtures of grain.

Q. It would be absolutely no use sowing any other varieties of spring wheat in that district?

A. It may be that all the varieties available have not yet been tested. Goose wheat, however, is probably one of the best to use, as it contains a high proportion of nitrogenous or flesh-forming constituents. When I spoke of it as of very poor quality, I was referring to its relative value for bread-making. Judging from our experience with such mixtures of grain as we have tried, I have no doubt you are quite correct in saying that the average crop from a mixture of that sort would be superior in weight to either of the varieties grown separately.

By Mr. Jackson (Elgin):

Q. With reference to wheat, have you gone on for any number of years using the same wheat in the same locality, and do you find it increasing in quality or diminishing in quality as well as in yield?

A. We do not grow wheat on the same land from year to year, except on the experimental fertilizer plots, where we have wheat under that plan grown for about eighteen years on the same soil from year to year, some of it with no manure, and some with manure of different kinds; on those plots treated with barnyard manure or complete fertilizers, we find the grain grown continues to be plump and to all appearance good. These experiments have been carried on to gain information as to the value of the different kinds of fertilizers for particular crops.

Q. What would you say as to the advisability of changing seed wheat from one locality to another, twenty or thirty miles apart? Would you say, that is a good move, or not?

A. I would rather not express any positive opinion on that point, but I think such changes are often beneficial.

Q. These are points that a practical farmer would like to have information upon.

A. I know that, and we are trying to get information on the subject as fast as possible.

By Mr. Wright (Renfrew):

Q. In my riding, the pea, if it is not going too far from the subject, perhaps it is to a certain extent germane, we find that where a farmer grows peas on clay land, it is all right, but if we take them up to Mount St. Patrick and grow them on the light soil there, in three years we have to come back to the clay soil to get seed again.

A. In such case, the clay soil would be likely to produce more plump and vigorous seed, and where there is a distinct gain by increase in weight and purity of seed, such change is no doubt beneficial.

By Mr. Jackson (Elgin):

Q. Are you making any tests along the line I have mentioned?

A. Yes, all along the line.

Q. So far as you have gone, what are the results of your tests? This is an important question.

A. Our changes of seed have not been within such small distances as those spoken of. We have changed from the different Experimental Farms, but we have not changed seeds with the farmers, for the reason that it is very difficult to find pure seed outside that we have been selecting and hand-picking, and hence our changes of seed have been limited mainly to our other Experimental Farms, and where we get

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an increase of crop following such change, it is impossible to say how much of that is due to change of seed and how much to season or other causes.

Q. Do you not bring in new wheats and try them on your Experimental Farms? Have you found by bringing in wheat from a district, say twenty or thirty miles from your Experimentl Farm, that that wheat is an improvement on the wheat that you were growing here all the time?

A. I do not know that we have done that. We have tried all the new wheats to be found in this country, as well as those in most other countries, and we do not expect to find additional varieties of value, the ground has been so well covered.

Q. That is a very easy thing to do?

A. Yes, but in most instances we should be bringing back wheat grown from samples we have distributed, because most of the best farmers depend on the wheat we have been supplying them with for renewal of seed for the past ten or twelve years, and the quality and weight of the crop would depend very much on the care the farmer had taken to preserve the purity of the sample he had received.

Q. Suppose you did bring back your own wheat after ten or twelve years?

A. It might be a useful thing to do; but, as I have already stated, if an increase of crop follows a change of seed, and I believe it often does, it is quite impossible for any one to prove how much, if any, of such increase is due to the changing of the seed. We are trying to get as much information as we can along those lines. Our object all the way through is to help the farmer to increase his crops, and of course, we devote most of our time to those lines of work which we think are most likely to bring this about.

VARIETIES OF WHEAT.

Speaking about varieties, here (producing sample) is a sample of wheat which I would like to bring under the notice of the members. It is called 'Turkey Red.'

By Mr. Findlay :

Q. When was the Fife wheat introduced?

A. I think it was in 1842 that the first plant was grown in Canada

By Mr. Christie :

Q. What size samples do you send out?

A. Five-pound samples.

By Mr. Lewis :

Q. How many do you send out during the year?

A. I was just coming to that, I have it in my notes, and will give it to you later, if you will permit me.

With regard to 'Turkey Red,' it holds about the same position in respect to the quality of flour and bread that can be made from it that Red Fife does among the spring wheats. It is a winter wheat, and it is very important that its qualities should be understood. This sample was grown near Lethbridge, Alta.

By Mr. Armstrong :

Q. Do I understand that with all your experience you, to-day, recommend the farmers of the Dominion to grow the Red Fife wheat?

A. Wherever it can be grown successfully, we advise the farmers to grow it

Q. And you have nothing better to offer them?

A. We have nothing better. We have a number of varieties that have been bred from Red Fife, selected plants that examined in the field have been found to manifest certain improvements. In other cases, crosses have been made with the Red Fife, and it is chiefly among the second crosses where the proportion of Red Fife blood is large.

that the most promising sorts have been produced. If you take the Red Fife wheat and make one cross of it with another distinct variety, you have the qualities of the parents about half and half, but if you take that first cross and recross it with Red Fife, you have then a variety with three-fourths of Red Fife blood, and it is from among these second crosses of comparatively recent origin, we have some varieties that seem to be quite equal to the Red Fife, and which may possibly be superior not only in quality but in earliness of ripening and strength of straw. As you get sports in stock-breeding, we get them also in wheat-breeding.

By Mr. Wright (Renfrew):

Q. In wheat-breeding, do you get sports, the same as you do in stock-breeding?

A. Yes, certainly. You cross Red Fife with some other sort, and next year you sow the kernel so obtained, and it produces one plant. You sow the seed of that plant next year, and you may have a dozen or twenty varieties, some of which are quite distinct, and you have to select from those, one or more of the most promising as your types to breed from, and reject all the others, otherwise you would soon get more varieties than you could look after. By breeding true to these types, you get them fixed usually in four or five years, and after that there is but little sporting or variation. Sometimes in one of these sports you find a variety with points of excellence superior to either of the parents.

By Mr. Sinclair:

Q. Is this Goose wheat a distinct variety, and is it fit for export?

A. It is certainly a distinct variety, indeed it is a distinct species of wheat, the kernels of it are very hard, it is one of the macaroni wheats which was early introduced into this country, and which has been grown in Canada for many years. More recently these macaroni wheats have been tested extensively in the drier districts in the United States and have done very well there. As they do not make good flour for bread-making, they are not in favour with millers, and they do not command, as a rule, quite the same price as other wheats. There are some districts where these wheats have been bought for European consumption, in which they have brought about the same price as other wheat, because there has been a demand for these wheats in Italy and in London for special purposes. In Italy, the demand for them is for making macaroni, and in London, England, it is for making pie crust and other sorts of pastry that do not require a light, tough, spongy dough. These Durum or macaroni wheats answer such purposes very well, and in such cases they are preferred to the best bread wheats. Most of our Canadian Goose wheat is said to be exported for such purposes. Another variety is called Kubanka. This is grown very extensively in Russia and is also in demand in the London market for making pastry. I would not advise the farmers of Ontario to grow these macaroni wheats, unless they find that they can get such prices as will pay them to do so.

There is another thing with regard to the Durum wheats that I want to make quite clear, and that is this, that they are unsuitable where the rainfall is at all heavy. In the drier districts of the country they give larger crops than in Ontario. We have tested these wheats at Nappan, Ottawa, Brandon, Indian Head, and Agassiz. At Nappan, N.S., we have a moist climate, where we have averaged about 22 bushels per acre. At Agassiz, where the climate is also moist, the average has been about 25½ bushels. At the two western farms, where the climate is drier, the crops have been larger. At Indian Head in a five years' test they have averaged 45 bushels per acre, and at Brandon nearly 49 bushels. We expect, judging from the tests that have been made, that in those portions of the country where there is not much rainfall these varieties of wheat will be grown to advantage. The Kubanka wheat we have found to turn out much better than the Goose, and that it makes bread of very fair quality, but yellow in colour.

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By Mr. Lewis:

Q. Where the country is favourable to its growth, how does it compare with the average of Red Fife?

A. It has a higher average than Red Fife where the country is favourable. In Colorado and Nevada and other dry areas in the United States, where formerly but little wheat has been grown, large quantities of these Durum wheats are now produced, for the reason that they are well adapted to the dry climate, and further, that the people are learning better methods of treating the soil so as to preserve moisture.

Q. What is the difference in the export price?

A. I have never seen any export price published for any of the Durum wheats in this country.

Q. You say it is all exported, none of it is used in Ontario?

A. Yes, but the quantity grown in Ontario is not sufficient to call general public attention to it. It has been in the hands of a few people who have their special customers for it in Europe.

Q. Is there any one brand of it better than another in Ontario, or is all about the same?

A. We have had four varieties under cultivation at the Experimental Farm, but we have only tested two of them yet as to the quality of the flour they make. The Cerealist of the Experimental Farm will be able to give you further particulars in regard to that matter.

IMPROVED METHODS IN CULTIVATION.

Among other circumstances which have tended to advance the farming interests of the country, in addition to those I have already mentioned, is the greater attention which is being paid to the rotation of crops, which has become quite general with the farmers in Ontario, and also to the purity and germinating power of the seed; further, to the keeping of the land cleaner from weeds, which rob the soil of a large amount of fertility and of the moisture that the crop itself needs. All these things have favoured increase in the crops.

Another circumstance which has advanced the general farming interests of this country within the last twenty years is the almost total abandonment of the exportation of coarse grains. We must export our wheat, we cannot avoid that, but we have an amount of fertility in the Northwest soil that will serve for some generations and enable us to do that exporting with advantage. At the time the McKinley Bill was introduced in 1890, which shut off completely our exports of barley to the United States, the soil in the barley districts was getting very much impoverished, and the yield per acre gradually coming down, because the farmers were sending much of the fertility of their soils from year to year with the barley sent to the United States. The McKinley Bill stopped this suddenly, and the result was that the Canadian farmers were obliged to take up other lines, and they very wisely adopted the practice of feeding their grain to cattle and swine and exporting dairy products, beef and pork, and whereas the farmers formerly exported millions of pounds of barley to the United States containing large quantities of fertilizers extracted from the soil of Canadian farms, our farmers are now feeding cattle and swine, and in some places sheep, and restoring in that way, by the proper return of the fertilizing material to the soil, the natural fertility of those lands, until those very lands from which the barley was formerly exported, and which now support cheese and butter factories and produce beef and pork, have improved so much that the crop of barley averages considerably more than it did at the time the farmers were exporting barley. Under these altered circumstances the conditions of farming have improved, the farmers are making more money, and the fertility of the land is being maintained to such a degree as to lead to the belief that the continuance of good crops is assured by the improved method of farming in those districts. Now there is but an insignificant part of the

barley and oats grown in Canada exported, nearly the whole of it goes into the feeding of animals. This change has improved the farming industry of this country and made it more profitable.

By Mr. Schell (Oxford):

Q. Which do you think exhausts the fertility of the soil most, oats or wheat?

A. There is not much difference between them in regard to the quantity of the more important fertilizing ingredients that are taken from the land:—nitrogen, phosphoric acid, and potash. They vary a little in the relative proportions of these fertilizing constituents taken from the land, but the result is about the same in regard to the exhaustion of the soil.

Q. Do you not think that oats take a great deal more potash than wheat?

A. Yes, they do. While an average crop of wheat will take from the land for the grain and straw about 20 pounds of potash, a good crop of oats will take about 32 pounds.

By Mr. Smith (Oxford):

Q. I saw a report in the papers with reference to a discovery by Sir William Crooks of a process for extracting nitric acid from the air, has that been confirmed?

A. Yes, it has. Sir William Crooks made the discovery some years ago that under the influence of electricity the nitrogen of the air would be converted into nitric acid.

Q. You know there have been experiments carried on at Niagara Falls?

A. Yes, I understand that a company operating there has sunk over a million dollars in experiments trying to solve that problem. They succeeded, but found that the nitric acid cost more money to produce than they could get for it.

I recently met with an extract from an address delivered at the Technical College in Berlin, Germany. In this address the lecturer disclosed the most recent particulars regarding this work and what has been done in Norway. In the present state of our knowledge it is said that nitric acid cannot be made profitably where the horse-power will average more than \$4 a year, and at Niagara, I think, it costs several times that sum. But in Norway there are some immense waterfalls where power can be produced very cheaply. A company there has got hold of about 400 horse-power, and they are operating a nitric acid factory with 20,000 horse-power. They have been able to produce nitric acid at such a price as to make it a commercial success. The acid has been saturated with lime, and then sold as nitrate of lime. As a fertilizer, this will produce all the good effects of nitrate of soda, and as it is expected that the present source of supply of nitrate of soda will be exhausted in less than twenty years from now, it is of importance that we should have some material to fall back upon.

Q. The only nitrates now to be got are from the dry regions of Peru, in South America?

A. Yes, and there are about a million tons of nitrate of soda used every year as fertilizers. Germany is said to use about 500,000 tons, and Great Britain uses a great deal also, so that the supply is being rapidly exhausted. Hence the question of new sources of supply is a very important one. At the factory referred to in Norway they make over 30,000 pounds a day of nitric acid, and if it is made a success in one place, other localities will no doubt be found where it can be economically produced. The process also by which it is made may be improved, as further experience is gained, so as to reduce the present cost of manufacture.

By Mr. Smith (Wentworth):

Q. With the cost of power reduced would it be possible to compete with present market prices?

A. With low cost of horse-power they could compete with the prices now prevailing.

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By Mr. Sinclair :

Q. Talking about fertilizers, what have you to say as to the character of the product turned out from the government reduction works at Canseau where fish scrap is used ?

A. Our chemist has been investigating that and can give you more particulars than I can. I learned, however, from Mr. Shutt's reports that he has found that the fertilizing constituents of this fish scrap are very valuable from a chemical standpoint. But it contains a very large proportion of fat and in the use of it as a fertilizer this seems to interfere with the giving up of the fertile constituents to the soil in such a way that it lessens its value. For some time past experiments have been in progress to improve this product and there have been some recent analyses made with which I am not familiar.

Q. Is the oil injurious to the soil ?

A. No, it is not that, but when the oil is combined with the fertilizer it does not seem to have the same effect in stimulating plant growth as it would otherwise have. We have not been able to see much in the way of results from the use of it on the crops. We have only tried it through one season, and it was rather late in the season when received, so cannot be very positive in our conclusions as to its usefulness.

Q. Was it not successful ?

A. It did not produce much improvement in the crops and the chemical analysis shows it was actually very rich in those constituents that should have produced strong plant growth.

By Mr. McIntyre (Perth):

Q. Perhaps the constituents were such that the plants could not absorb them ?

A. Our chemist gave as a reason for our want of success the presence of so much oil associated with the fertilizing material.

By Mr. Sinclair:

Q. The matter is of great importance in the Maritime Provinces because there is a large quantity of fish scrap going to waste and if it could be utilized it would be very important indeed.

A. Yes, we appreciate that fact and we are doing everything we can to get information on the subject.

Q. The fish, such as are used in the government works, are put on the land by some farmers in a natural condition, and they produce good crops. These fish contain the oil and livers and other organs. If the oil does not interfere with the yield of crops when the fish are used in this way there must be something in the process which has a bad effect.

A. We are trying our best to ascertain the cause of this difficulty.

FREE DISTRIBUTION OF SEEDS.

Several of the members have asked about the distribution of grain to farmers for the improvement of seed and how this work is arranged. When a new variety of a promising kind is offered to the farming public sufficient quantity is secured to test it at the Central farm. If it proves promising at Ottawa and gives a good crop, we distribute it for test to the branch experimental farms, and in the course of four or five years, if it continues to maintain a promising position for productiveness and quality, it is grown more largely and then included among the varieties offered for distribution for test among the farmers of the Dominion. Care is thus taken that our distribution among Canadian farmers consists of varieties which are well established in regard to their productiveness and quality and which we feel sure are worthy of being tested over the whole country. I brought with me to-day samples

of the most promising varieties of different grain now being distributed. Here are Red Fife, White Fife, Preston, Percy, Pringle's Champlain and Early Riga wheats; Banner, Wide Awake and Thousand Dollar oats; Mensury barley, six-rowed, and Canadian Thorpe barley, two-rowed. These form the bulk of our distribution.

A few words will serve to indicate the growth of this work. In 1887, that is the year that the farms were established, we sent out 1,149 samples for test. Samples have been sent out every year since then and the number is increasing. In 1888 the number sent was 2,150; in 1890 it had got to 15,532; in 1895 the number had reached 30,553; in 1905 the number was 42,000, and last year it was 43,885. At present, up to this date, we have sent out about 7,000 samples and we are sending out an average of 250 to 300 samples a day. This morning we received 785 letters, most of which contained applications for samples, and the evening mail will bring that number up to over 1,000. Last year we had over 1,000 a day during the whole month of February. Most of them were applications for grain. We find the farmers everywhere taking the greatest interest in this work. We send five pounds of wheat or barley or four pound of oats. That is enough for one-twentieth of an acre in each case, and the man who gets a sample, say of oats, if he cultivates it with reasonable care and attention on good soil, will have an average of at least four bushels. This crop if carefully threshed and cleaned and not mixed with any other sort of grain, will next year give him two acres of oats which will be a pure sample. These two acres should give him at the very least 100 bushels at the end of the second year. If sown on 50 acres the yield at the end of the third year should be 2,500 bushels. This shows that it does not take long for a man to get all the seed he wants from one of these samples. The farmer has the Farm bulletins which will show what crops we have had and he can select the variety which has given the largest yield. In this way the greatest good is being done to the country from one end to the other. The varieties that we have been growing are coming into general use in commerce, and it is helping the average yield of grain everywhere, and it is helping the reputation of the country by keeping up the quality and weight of the grain.

By Mr. Lewis :

Q. Do you send a man the kind of sample of grain that he wants ?

A. We send him, as far as is practicable, what he asks for, and the 'Crop Bulletin' is sent to every one on the mailing list.

Q. Do you distribute any varieties of roots ?

A. No, the distribution is confined to wheat, barley, oats, peas, Indian corn and potatoes.

By Mr. Armstrong :

Q. Am I correct in understanding that the best variety of oats you can recommend for the farmer is the Banner ?

A. We regard the Banner oat as one of the best sorts in cultivation. Our reports and bulletins show that it has given us a larger number of bushels per acre than any other variety.

Q. And what is the name of the variety of barley which has given the largest crops ?

A. The Mensury.

Q. Mensury is the best ?

A. Yes. We have found it in our experiments the most productive.

I desire to call your attention to the sample of the Banner oats grown this year at Indian Head which weighs 42 pounds per bushel. The crop was a heavy one—about 100 bushels to the acre. I am of the opinion that we get seed with higher productiveness by taking it from these large crops. There is another question bearing on the change of seed—

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By Mr. Lewis :

Q. With reference to a change of seed, do you ever supply the same man two years running with different seed ?

A. We have about 40,000 to supply each year and it is scarcely possible to keep track of individual cases.

Q. You have 40,000 to supply ?

A. Yes, over 42,000 received samples of seed last year.

Q. Do you supply all that ask for seed ?

A. All that apply to a certain period, up to the 15th of February this year. We are obliged to limit the period, otherwise people would keep sending in applications up to early summer which would interfere with our general work, as we need the men who work on the distribution as soon as spring opens for other work outside.

Q. Have you made any estimate of the number of bushels of wheat, oats and barley that you sent out as samples ?

A. Estimates have been made, but I do not remember the number of bushels; the weight amounts to 70 to 75 tons a year.

By Mr. Schell (Glengarry) :

Q. Do you supply anybody after the 15th of February ?

A. We do not receive applications after that date.

By Mr. Findlay :

Q. Do you supply them free ?

A. Yes, they go through the mail. Our mail from the middle of December to the middle of April ranges from half a ton to a ton a day.

Q. How much do you send in each sample ?

A. Five pounds of wheat or barley, four pounds of oats, three pounds of Indian corn or peas or potatoes. They are sent out in strong cotton bags and instructions are sent with them.

Q. You do not ripen Indian corn at Ottawa, do you ?

A. No, not generally, and in that case we are obliged to depart from the general rule laid down for our guidance; this is that all the seeds sent out should be produced at the experimental farms. The question of the growing of Indian corn for ensilage is so important to the dairying and cattle industries of the country that this is a sufficient excuse for the buying of corn in Western Ontario.

Q. Do you bring any of this corn in from the western states ?

A. Not to any extent. Most of it is got in Western Ontario.

The hour of adjournment having arrived, Dr. Saunders was requested to continue his address on Friday next.

Having read over the following transcript of my evidence, I find it correct.

WM. SAUNDERS.

Director, Dominion Experimental Farms.

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HOUSE OF COMMONS,
COMMITTEE ROOM 34,
FRIDAY, February 8, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 10.30 o'clock a.m., Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—Dr. Saunders will now continue the address commenced by him at our previous meeting.

BENEFICIAL RESULTS FROM FREE DISTRIBUTION OF SEEDS.

Dr. SAUNDERS.—Mr. Chairman and Gentlemen,—When speaking before the Committee on Wednesday last on the subject of the samples of seed grain which have been distributed to the farmers of Canada for the improvement of seed, I ventured to say that it was possible in three years to produce from one of the four-pound samples of oats that we sent out 2,500 bushels, and to have that stock at the end of the third year. In support of this I wish to quote from a letter received a day or two ago from Mr. W. A. Lyndon, of Lyndon, Alberta. I may say that Lyndon is a small village in the Foothills of the Rocky mountains, about 30 or 40 miles west of Macleod, at an altitude of 4,200 feet above the sea level, which is probably at as high an altitude as any farm cultivated in the Dominion. In his letter dated January 25, 1907, Mr. Lyndon says :

‘In 1904 I sowed the sample of four pounds of Tartar King oats got from you. This year I threshed 1,600 bushels. They yielded this season at the rate of 116 bushels per acre.’

With your permission I will also quote extracts from several other letters recently received, so as to convince any one who may not feel satisfied as to the value of this distribution. These letters show also that many of the people who get samples take good care of them, and bear testimony to the further fact that this distribution is improving the character of the seed grain of the Dominion, and that the publications sent out from the Farm are very acceptable. In every part of Canada, from the Atlantic to the Pacific, farmers have received these samples, and when a man gets a good thing he is likely to make it known, as he wants to make money out of it. Hence, he sells seed to neighbouring farmers, and thus the community generally is benefited.

Moise Cormier writes on December 1, 1906, from LaSalle, Manitoba :

‘From the sample we received in 1904 we have this season harvested 300 bushels of pure Red Fife, and we are now in possession of a good quantity of pure seed wheat, which has cost us nothing but the labour. Please accept my best thanks.’

Mrs. E. A. Grove, of Weyburn, Saskatchewan, writes under date of January 1, 1907 :

‘The sample of wheat we got three years ago will furnish seed this year for 150 acres.’

Mr. John Bily, of Riversdale, Saskatchewan, writes on January 21, 1907 :

‘About ten years ago I got from you a sample of Ligowo oats, and now about fifty farmers bought it from me, and all say they could not wish themselves any better oats. They yield more to the acre than any other oats I ever had.’

Mr. James Lightley, of Gidley, B.C., says under date of January 20, 1907 :

‘I wish to apply for a sample of oats. This season my choice is White Giant. Please accept my hearty thanks for last season’s gift of seed potatoes, which were very successful.’

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Mr. James Smith, of Shepard, Alberta, writes on December 17, 1906:

'I have 40 bushels of Carman No. 1 potato from a three-pound sample, received three years ago. They are a fine potato.'

Mr. R. E. Mitchell, of Cook's Creek, Manitoba, says under date of January 26, 1907:

'I thank you very much for sending me your Experimental Farm bulletins from time to time, as they are very interesting.'

Mr. J. R. Giles, of Island Lake, Alberta, writes December 31, 1906:

'I beg to express my thanks and appreciation of the various pamphlets and reports I have received from the Experimental Farm from time to time.'

'We have this fall built a double poultry house in accordance with the plans and suggestions in Bulletin No. 54, and find it to be answering very well. With best wishes for the success of your valuable experimental work.'

This morning I happened to get a letter from Mr. August Dupuis, one of the most enlightened agriculturists and horticulturist in the province of Quebec. He lives at the Village des Aulnaies. This is with regard to the recent crop bulletin giving the results of the testing of many varieties of grain and other important farm crops during the past year. He says:

'Bulletin No. 55 is a treasure of facts for the farmer, stock raiser and market gardener.'

This is perhaps sufficient evidence to offset the idea that some people seem to have who do not look into the matter very closely, that this distribution of grain is largely a waste of labour, and that the samples are very often thrown away or made very little use of. The labour involved in the efforts to find out which are the best varieties of grain for the farmers of Canada to grow is very great. Very few people have any idea of the amount of work required to be done in this direction. The varieties are always tested for not less than five years before their value is determined, when the best are selected and grown for distribution among the farmers.

By Mr. Lewis:

Q. The letters you have read are all from the West. Have you any from Ontario?

A. There were a number, but I brought only those I have read, as I did not want to burden the committee with much material of this sort. Those I have referred to came in within the last few days. I could easily furnish many more if desired.

Q. How do the samples average in the distribution between Ontario and the West?

DISTRIBUTION OF SEED FROM CENTRAL EXPERIMENTAL FARM, 1906.

A. The distribution last year was made up as follows: Ontario, 7,269; Quebec, 15,918; Manitoba, 3,159; Saskatchewan, 4,621; Alberta, 2,542; British Columbia, 968; Prince Edward Island, 1,301; Nova Scotia, 3,071; New Brunswick, 4,636.

Q. How do you account for the fact that Quebec received double the quantity supplied to Ontario?

A. One reason, I think, is that the people generally in Quebec are paying closer attention to the work of the experimental farms than the people in any other part of the community, excepting perhaps those in the Northwest. Furthermore, they have not as a rule quite the same advantages in the way of agricultural periodicals as the farmers of Ontario. Therefore, they treasure the Experimental Farm Reports and bulletins, where they learn of the experiments conducted and the large crops which the most productive sorts give, and more generally avail themselves of such opportunities of improving their condition.

By Mr. Blain:

Q. I think there is another explanation, and that is, that there is a distribution going on from the agricultural farm at Guelph each year, which supplies a large number of farmers?

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A. That is very true. The distribution from Guelph no doubt exerts a large influence in Ontario, as it is confined to that province.

By Mr. Lewis :

Q. Are the samples all sent from here, or are samples also sent from the experimental farms in the West ?

A. The samples are sent chiefly from here, but there are a considerable number sent from the branch farms also.

By Mr. Conmee :

Q. Were all the requests from Ontario filled ?

A. All that were received within the time named. We are obliged to fix a time for closing the distribution, otherwise we should be laden with this work when the spring operations began, which would interfere with our regular work. This year the 15th of February was fixed as the limit of time for receiving applications for samples. We interpret that in this way : Any letters that are mailed on or before the 15th are attended to. Sometimes a letter will be two or three weeks reaching us, and it would not be quite fair to those living at a long distance from Ottawa if we required that all the applications reach us by the fifteenth. By this arrangement all the applicants are placed on the same footing no matter where they may reside. With that liberal interpretation, we can generally manage to clear everything off the boards by the time the spring work begins at the Central Experimental Farm.

Q. Then it would follow that all the applications that were made from Ontario were filled ? Would that be right ?

A. Yes, provided they were sent to the Farm within the time specified.

Q. I mean all that applied within the specified time. They were dealt with the same as the people from any other province ?

A. Certainly ; every province is treated alike. The distribution I am referring to here will be understood as the Central Farm distribution, and does not include the distribution which takes place from the branch farms. That is dealt with at each branch farm and will total generally about 5,000 samples.

Five years ago we had under test 243 different kinds of cereals. Such a list we knew was too large for the average farmer to master, but it was necessary that all these varieties should be tested. After five years' trial many of them were found less productive and less valuable than others and they have been gradually discarded. During those five years the 243 samples have been reduced to 101. That number covers all the varieties we now have of wheat, oats, barley and peas. Thus a great deal has been done to clear the ground for future work. Our spring wheat list now, instead of being 71 varieties as it was five years ago, has been brought down to 14. We shall not be able to keep it at that, as we must introduce from time to time new varieties that we are originating. Investigations are going on constantly at the farm, and new varieties are produced every year. Some of these are obtained by cross-fertilization and some by selection. Wheat receives the greater part of our attention. Last year there were under cultivation at the Central Farm over 2,000 varieties of wheat alone growing, mostly in small quantities. Hundreds of these have been discarded since harvest after careful examination made as to quality and crop, while with such sorts as are sufficiently promising the work must be continued.

Special efforts are made to maintain the purity and quality of the Red Fife wheat, which is so valuable in the Northwest. Quite a large area of land is devoted at Brandon and Indian Head every year to the growing of this variety. We are supplied at Ottawa with what we need of the Red Fife and other useful sorts for the distribution of samples, and the remainder of the wheat not required for seed is sold to farmers in Manitoba and the Northwest in quantities of two to five bushels, so that they may have enough to make a good start if they want to renew their seed. There are always a great many more applicants for the seed than it is possible to supply, but we generally manage to furnish from two to three hundred farmers every

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year with these larger quantities of Red Fife. That is very much appreciated. The demand for samples of Red Fife for the improvement of seed is also large, and from the Central Farm alone 2,134 samples were supplied last year. Many samples were also sent from the branch farms.

By Mr. Lewis :

Q. Where were those distributed ?

A. Those were distributed over the whole Dominion.

Q. Did the 2,134 samples go to all the provinces ?

A. Yes, they were distributed to all, but I could not say in what proportion. The total distribution of sample bags of wheat throughout the Dominion was 9,959, which were distributed as follows : 371 to Prince Edward Island, 639 to Nova Scotia, 1,016 to New Brunswick, 3,394 to Quebec, 713 to Ontario, 1,173 to Manitoba, 1,905 to Saskatchewan, 670 to Alberta, and 78 to British Columbia. That includes all the varieties of wheat.

By Mr. Finlayson :

Q. Where is this wheat grown ?

A. Most of it is grown at Indian Head, Sask., and at Brandon, Man. We had two carloads of grain this year from Indian Head for distribution and one carload from Manitoba.

Q. Is it grown at your experimental stations in those places ?

A. Yes, nearly all of it is grown there.

By Mr. Jackson (Elgin) :

Q. Very little of it was grown in Ottawa ?

A. Very little indeed. Our plots of grain are too small to serve this purpose. There are 200 acres of the Central Farm devoted to rotation experiments, and large areas to horticultural and other branches of work, so that there is very little room for the growing of grain for distribution.

Q. Do you buy any seed grain for distribution outside of that which is grown on any of the experimental farms ?

A. It is not usual to do this, excepting in the case of Indian corn, which does not ripen well at any of our farms. Last year we were visited by a hail storm at Indian Head, the first injury of this sort we have ever had. I happened to be there the following day when the crop looked so unpromising that I told the superintendent he had better buy a hundred bushels of Red Fife from one of his neighbours, who had a very good sample, so that he might be sure we would have some for distribution. But the grain picked up again at Indian Head in a remarkably short time, and we had a very good crop after all. That hundred bushels of Red Fife was a very fine sample and was sent to Ottawa with the other grain for distribution. That is the only instance I can recall where we have during many years bought seed grain to distribute.

Q. In reference to oats and other grains, are they grown principally on the experimental farms ?

A. Yes.

Q. And potatoes the same ?

A. Potatoes are grown chiefly on the Central Farm. I think it is an advantage when selecting for distribution to have grain from crops that have shown great productiveness. At Indian Head the average of the oat crop last year was about 100 bushels to the acre, whereas down here we cannot usually get more than 50 or 60 bushels. Hence, most of the oats sent out have come from that farm. The same principle, I think, holds good with regard to other sorts of grain.

By Mr. Schell (Oxford) :

Q. Which varieties of oats gives the best yield ?

A. The Banner, I think, gives the best yield, although we have now several other

sorts of oats which are very nearly as productive. Occasionally, at some of the experimental farms, some of these best varieties will exceed the Banner, but taking it on the whole the Banner will average, I think, a little better than any other variety we are growing. A difference in soil will sometimes affect the yield and the results will vary from this cause. In a letter which I read to the committee a few moments ago, a correspondent, speaking of the Ligowo oats, says that they are the best oats he has ever grown. In some districts they seem to exceed the Banner in yield, especially in some parts of British Columbia, but taking the larger grain growing area in the Dominion, one cannot go astray in recommending the Banner oats, and the fact that Manitoba and the Northwest give a higher average crop of oats, and the fact to the fact that the Banner is the principal variety grown there.

Q. Is the Banner oats generally the best on the Ottawa farm also?

A. Generally. Some times they stand second or third on the list, but they always give good crops and always stand very near the top.

In growing Red Fife we devote a good deal of attention at Ottawa to watching the variations that occur from time to time in the variety, where the plants are grown alongside of each other. Occasionally a plant is found with stiffer straw than usual, and sometimes a slight improvement is found in earliness of ripening or in the quality of the grain, and these are selected for further trial. These mother plants are harvested and examined further during the winter and if, when the examination is completed, they show sufficient points of excellence to warrant further cultivation, they are grown as separate varieties until we have satisfied ourselves either that they are better than the other sorts we grow or that they are not as good. The moment we reach the latter conclusion, they are dropped. Hence a great deal of work must always be done in these lines of experiment which fail to produce the results desired. The single crosses of Red Fife with other varieties are not equal in quality, as far as we can judge, to those sorts where there are three-quarters of Red Fife blood to one-quarter of the blood of the other sorts. It is from these latter crosses that we have now some of the most promising results. They are not quite so early as some of the single crosses, but they have a combination of good points which is likely to make them valuable. Where earliness is of paramount importance, as it is in some districts, the earlier ripening cross-bred wheats are of much value; but, wherever Red Fife can be ripened to good advantage we do not recommend the farmers to try any other variety. In case a farmer finds that Red Fife does not ripen well in his district, then we recommend him, in order to avoid frosted grain, to test some earlier varieties, which are quite as good for any local use and for the making of flour for domestic purposes, but not quite so good for export. It is far better to have an earlier variety that is a shade lower in quality than Red Fife than to have frosted grain which would bring the price down to a very low figure. Recent appliances that have been introduced at the Central Farm for making flour and bread, which I have mentioned, I think, in one of my earlier addresses, enable us now to ascertain the true value of a wheat in very much less time than formerly. When we had the handling of the Ladoga wheat, which was first imported twenty years ago, we had to wait until we could furnish a carload of the grain before any miller would undertake to make flour from it and guarantee that it was strictly pure. So we were obliged to encourage the growing of that wheat in a number of places in order to secure a sufficient quantity for the test. As soon as a carload was available, it was sent to the miller to be ground, and a bulletin was published on the result of the examination of that flour and the making of it into bread. Now with three or four pounds of the wheat we can make a better test than was made in those days with a carload. That is a great advantage and enables us now, and will enable us in the future, to get over the work with a rapidity that was quite impossible in the past. We shall thus be able to learn every year the exact milling quality of a number of new varieties of wheat and to find out whether any of them possess that high quality and productiveness necessary to warrant their being recommended for general cultivation.

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TESTS OF FIELD CROPS.

Many experiments also have been conducted in the growing of Indian corn and field roots and potatoes to determine which are the most profitable to grow for the feeding of stock and for human consumption. Tests have also been made with different sorts of vegetables, to find out which are the most profitable for farmers to grow.

By Mr. Christie :

Q. What about peas ?

A. Peas are tested also and distributed to a limited extent. The difficulty in late years about peas has been the prevalence of the Pea Weevil, and, while we have taken every precaution to keep our stock as free from that pest as far as we could, we have occasionally been obliged to buy peas because we could not grow enough, and have sometimes been disappointed in finding that they were more or less infested with bugs. For this reason we have not distributed many peas for several years past.

Q. During the last two years have peas been troubled with the bug ?

A. We have not bought any during that time, but have been getting them from the experimental farm at Indian Head, where they have no bugs. I believe, however, that the pea bug has not been plentiful in Ontario for the last two seasons.

Q. Take my county, during the last two years there has been no bug.

A. There may not be, but if a farmer finds only one or two in a sample of peas from the Farm we are sure to hear of it, and we are expected to be much nearer perfection in that respect than the average seedsman. With regard to the question of varieties of peas, we have very little positive information. There are a number of different named sorts in commerce, but no authentic description of the varieties have ever been published which would enable any one to recognize them. That, however, is being gradually remedied. It is quite different with garden peas. They are all carefully described in the seedman's catalogue. The seedsmen in the United States handle our peas a good deal and advertise them usually as Canadian peas. If any questions are asked as to the variety, the only information to be had is that they are Canadian peas, and the dealer does not realize that there are any varietal distinctions. We have grown about forty varieties on the Central Experimental Farm for some years, but within the past three years these have been reduced to about half that number, and they are, I think, pretty well distinguished varieties. But there is a great deal to do in the way of experiment and comparison before we can determine which are the best of these. They are frequently found so mixed that it is not possible to tell what variety they are.

In field roots a number of varieties have been tested. These tests were begun about twelve or fifteen years ago by growing the different varieties that were offered by Canadian seedsmen. Subsequently, it was thought well to grow alongside of these some of the most noted sorts that are offered by the large seedsmen in Great Britain and in Europe. We have imported every year, for the last six or seven years, from these seedsmen the best strains of their seed, and after careful trial for the period named have found that the seeds obtained from the Canadian seedsmen have given crops fully as good as those bought from the best of the seedsmen in Europe. As our farmers are not able conveniently to import their root seeds, it has been thought best in future that our test plots of field roots be conducted entirely with seeds obtained from Canadian seedsmen.

Before I pass from this subject, I would ask if any member wishes to ask any questions.

Q. What kind of mangold do you consider most profitable for the farmer to grow ?

A. There are two classes of mangels which give very large crops—the Mammoth Long Red and the Giant Yellow Intermediate—and there are a number of different strains in each of these classes bearing different names in the catalogues of the seedsmen, but varying very little in quality or productiveness. Most commonly, I think,

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in our trial plots, the Giant Yellow Intermediate has averaged a little heavier in crop than the Mammoth Long Red, although the latter is believed by a good many farmers to be a little better in quality. I do not think myself there is much difference in the quality ; they are both remarkably productive.

FRUIT TREES FOR THE NORTHWEST.

Experiments have also been continued with the cross-bred apples, which have been produced at the Central Farm for the Northwest. These fruits have been distributed now to about three hundred different points in the Northwest provinces at different altitudes, varying from an elevation of 743 feet at Winnipeg to 4,200 feet at Lyndon in the Foothills of the Rocky mountains in Alberta. That is probably about the highest elevation in the Northwest where farming is carried on. These cross-bred apples are growing at all these points and have established their character for general hardiness. Last year in quite a number of places they bore fruit which was much appreciated by the growers. No doubt during the coming year a great many more of these apple trees will fruit. In the meantime so many people in the Northwest provinces are applying for trees that it is quite beyond our power to grant the requests, and in future we shall have to leave any further distribution of these trees in the hands of nurserymen whose business it is to grow and to sell such stock.

We have also conducted at all the experimental farms a great many experiments with small fruits.

By Mr. Blain :

Q. May I ask, have the farmers throughout the province of Ontario planted very many apple trees in the last few years ? Is the number on the increase ?

A. That is a matter that we have not investigated, but it is reported on every year by the Bureau of Industries. From the last report published it would appear that the number of bearing apple trees is less than it was ten years ago, while the number of young trees is greater.

THE SEEDLESS APPLE.

By Mr. Wilson (Russell) :

Q. Has any action been taken with regard to the seedless apple that some people in Ontario have been trying to boom ?

A. I understand that a good many trees have been sold to persons who desire to test this fruit. It has been shown that the seedless apple is of very little value, and is inferior in quality. There have been several seedless apples introduced at different times during the last ten or twelve years, and hence a seedless apple is not a new thing, but this particular one has been taken hold of by a company with apparently a good deal of capital. The people employed to push this fruit on the community are very enterprising and persistent, and they have shown great zeal in their efforts. There was a committee of experts appointed at the Toronto exhibition to examine the fruit shown there and the report of that committee was very unfavourable.

By Mr. Black :

Q. There is no core in the seedless apple ?

A. There is usually a little in most specimens.

Q. What advantage has the seedless apple ?

A. I cannot see that it has any great advantage. It has, however, one great imperfection. At the calyx or blossom end of the apple there is a hole where insects can get in and out, and find lodgment. There was a good deal of dirt collected in this place in some of the specimens that I saw. That point is closed in the ordinary apple. The committee referred to, found occasional seeds in some of the specimens examined, showing that the apple was not entirely seedless, although nearly so. But the quality

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of the fruit was very deficient. With such faults the mere fact of it being a seedless apple or nearly so is no great recommendation.

Q. I cannot see much recommendation, but simply the fact that the apple has no seed?

A. I think that is about correct. The seedless orange is deservedly in favour because it associates high quality with the absence of seeds; but in this fruit the inferior quality and other imperfections will prevent it from ever becoming popular.

Mr. Wilson (Russell):

Q. The price asked is \$2.50?

A. Yes; the price is simply absurd. Barnum discovered that the public liked to be humbugged, and I fear this condition of things still prevails. A great many people seem to appreciate a thing they have to pay a good price for.

GROWTH AND MANUFACTURE OF FOOD PRODUCTS.

A. It must be very gratifying to us all to see the great progress that has been made in Canada in the growth and manufacture of food products. The expansion of our exports has been remarkable within the last twenty years, and especially within the last ten years, and now our surplus of wheat, flour, cheese, butter, pork, fat cattle and fruit find their way into all the leading markets in Great Britain, and in many places on the continent, and they have given to Canada a character which is very enviable. With the further development of the country, and the large number of settlers now coming in, there is practically no limit so far as the output of these different products is concerned. I see no reason to anticipate any diminution in regard to our exports for many years to come, but rather a steady increase, and in this way we shall get from the soil some of the immense wealth that is laid up there for our use, in the form of plant fertility. Thus we hope that our commerce will be built up and our people enriched. With the permission of the Committee, I will now say a few words on the second part of my subject.

My Mr. Jackson (Elgin):

Q. Before you leave that branch. You made a reference to live stock. Is there any interchange of the cattle that you have on the farm, that is, do you send any stock that you have on the Central Farm to any of the other farms in the Dominion?

A. Yes, we frequently send male animals and sometimes females, but mostly male animals.

Q. Have you any idea about how many males you sent from the Central Farm to the other farms last year?

A. I could not say. Mr. Grisdale, our agriculturist, who will probably appear before you later, can give you exact information on this subject. Any animals that we do not want to keep are sold. Some of them are sold for breeding purposes, and some to the local butcher or exporter.

APPLE GROWING IN MANITOBA.

By Mr. Jackson (Selkirk):

Q. I regret that I was unable to be present at the last meeting, and unfortunately arrived a little late this morning. Is there any information you can give us about the cultivation of fruit in Manitoba? There are one or two things I would like to ask you. You are aware that the late Mr. James Franklin, of Stonewall, was largely engaged in raising apples for the past few years?

A. Have you ever visited his place?

Q. Yes, I live right alongside of him. There is a peculiar circumstance I would like you to give me information about. Some ten years ago he gave me an apple tree.

one of his best known varieties, which was about six inches in diameter. It has come out every year up to the terminal bud and yet has never had a blossom on it. It is a perfect tree, seven feet high, and yet there has been no fruit whatever on it. I do not know of any other instance of that kind. Could you give me any explanation as to why that should happen to this particular tree?

A. No, I could not, unless it be that the blossom buds are tender and are winter killed each year. I was two or three times at Mr. Franklin's place when he was living, to look over his trees, and I was disappointed in what I saw. He would write me and his letters contained enticing descriptions of his apples and plums, but when I got there I could not reconcile the things I found there with his descriptions of their character and quality. His ideas of quality and mine did not agree very well. He would insist that he could grow better plums than could be grown in British Columbia, but he could not prove it to my satisfaction. He was a very sanguine and enthusiastic man and did some useful work in the way of introducing new varieties of fruits, especially plums from Minnesota, in addition to those produced by himself. Many varieties of his trees were bought and tested on the branch experimental farms at Brandon and Indian Head, but they were not very successful. The plums did not ripen early enough to be of much value in any part of Manitoba and those of his apples which I have seen were small and inferior. But what has surprised me very much is the wonderful success which has attended the efforts of Mr. A. P. Stephenson at Nelson. I have visited his place several times and he has succeeded there in growing an orchard which would do credit to the East. He has a good many varieties of Russian apples making thrifty growth and bearing well. There does not seem to be anything exceptional about his location except that it is well sheltered, but he has succeeded better than any one else. Many of his trees were sent him from the Central Experimental Farm about sixteen or seventeen years ago, when we distributed some apple trees to be tested in that part of the country. I think he is the only one who has succeeded with them. When I go to Manitoba and tell the people that the larger apples cannot be grown in a general way successfully in that province, they say: 'Here are some apples we do grow, what have you to say to them?' Since I know of scores of instances where people have planted such apple trees, and have failed with them, I am still compelled to say, notwithstanding the success had by Mr. Stevenson, that the larger apples cannot be grown in a general way in that province. At the time these apple trees were sent to Mr. Stevenson, a larger number of trees of the same sort were sent to the experimental farms at Brandon and Indian Head, but none of them have survived. True, the altitude is greater, but the difference at Brandon—about 200 feet—seems scarcely sufficient to account for the great difference in result.

Q. Would he not have more shelter?

A. Yes, I think he would, but we have had our trees at Brandon well sheltered. Indeed, in one instance, we put them out in the middle of a plantation, cutting out enough forest trees to give the apple trees room to grow. I do not think it can be a matter of shelter entirely, because all his trees are not well sheltered, although most of them are. I found, however, that there were other people in the neighbourhood of Nelson who grow the Duchess and the Wealthy and the Hyslop and Transcendant crabs. I have seen them growing in several places about Morden. The experience had by Mr. Stevenson and others is certainly very gratifying and should encourage the people in that district to plant more. Last year I spent a day in Portage la Prairie, Manitoba, when a gentleman I called upon said: 'You must come with me and see some of the apples growing here.' I went out with him and saw in a neighbouring garden two very nice trees with about thirty or forty apples on each tree. The trees were seven or eight feet high and seemed to be quite hardy, but these were the only specimens I saw. This apple was a Russian variety known as Hiberna. The Hiberna is one of the hardiest of all the Russian sorts.

By Mr. Smith (Wentworth):

Q. Mr. Stevenson's trees are not grafted on *Pyrus baccata* roots?

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A. No; most of his bearing trees are on ordinary apple stocks. The trees he is now sending out from his nursery are, I believe, on *baccata* roots, as they are much hardier.

Q. These trees are all bearing now?

A. All his larger trees are. His main crop is obtained from the trees sent him from the Central Farm sixteen years ago.

Q. They were not on *baccata* stock?

A. No; they were grafted on ordinary roots.

THE EXTENSION OF THE EXPERIMENTAL FARM SYSTEM.

The policy recently adopted by the government of Canada, in extending the system of experimental farms, is being carried out.

LETHBRIDGE FARM.—The first farm established is that at Lethbridge, in Southern Alberta. This town occupies a central position in a large district where the soil is fertile; but the rainfall is scanty and insufficient for some crops. The agricultural methods practised in the northern part of Alberta are not entirely applicable to the southern part, on account of the light rainfall. What is called dry farming has to be practised there, on account of the limited amount of moisture. In what is known as dry farming there are some special implements used, which have been devised to assist in maintaining and conserving moisture in the soil, and the times of ploughing and of cultivating are varied, so as to be carried on with the least possible waste of water. On the other hand, there are large parts of Southern Alberta which are being brought under irrigation, and this farm which the government has chosen for an experimental farm consists of four hundred acres, one hundred of which can be irrigated, while the other three hundred cannot, as the land lies too high to be within reach of the water. The intention is to carry on experimental work there with irrigation, and on the same lines without irrigation; to take up all the questions we have been taking up at the other experimental farms with such other special experiments as the altered conditions may require. Investigations will be carried on to determine the best varieties of wheat, barley and oats, and other important farm crops, the best methods of treatment of the land and of conserving the fertility of the soil, the value of rotation of crops and of the ploughing under of clover. A good deal of attention will naturally be given to the question of growing alfalfa, as that is the great crop which has proven so successful on irrigated land in the United States. From statistics, it appears that about 65 per cent of all the irrigated land in the United States is under alfalfa, indicating that it is one of the great crops for a farmer to grow for profit, when he has the advantage of being able to grow it with an ample allowance of water. The growing of alfalfa on irrigated land has generally been associated with dairying or the fattening of cattle, so that we may look for large developments in Alberta in connection with farming, in a comparatively short time. The farm at Lethbridge is situated on what is known as the Alberta Irrigation Company's lands. The water supplied for irrigation is taken from the St. Mary's river. The ditch is about one hundred miles in length, and the area of land they are able to irrigate is quite large. But the irrigation works of the Canadian Pacific Railway are beyond anything ever before attempted in the Northwest. The area covered by their canals east of Calgary is larger than all the irrigated lands in Colorado; and the company expect to spend about \$5,000,000 in completing the scheme. They have already disposed of a good deal of their irrigated land, and expect a great influx of settlers as soon as they are able to supply water. It is our duty, looking after the encouragement of all branches of agriculture, to be early in the field and to collect all the information obtainable, as well as to determine by actual experiments what quantities of water should be used in growing certain crops. Sometimes the farmer who has command of water has used too much and produced a heavy growth of foliage, which delayed ripening, and frost has occurred before the crops were mature, so that injury has resulted from the use of water rather than benefit. It is hoped that after

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carrying on experiments, for a few years it may be possible to lay down rules in regard to the use of water which will be valuable to all that section of country. One of the early results of the use of water will be the production of quantities of useful fodder material on land which heretofore has been of little or no value. This will encourage the stock industry. A superintendent for this experimental farm has been appointed, who is experienced in these lines of work. Some ploughing was done when I was there last August, and we hope to get some experimental work begun during the coming year.

Q. Is this at Calgary?

A. No; this is at Lethbridge. The irrigation works of the Canadian Pacific Railway are east of Calgary. The water of the Bow river is brought to the level of the land at a point about twenty miles east of that town, and near Langdon. At Langdon, a farm for experimentation and demonstration work, is to be established, and another further east at Gleichen. Experiments will be carried on at these farms, to demonstrate what crops can be grown to the greatest advantage, and as to what treatment of the land is best.

By Mr. Blain :

Q. How many acres have you at the Lethbridge farm ?

A. Four hundred acres, 100 acres of which is intended for irrigation experiments and the other 300 for dry farming. While there is a great deal of land in the province of Alberta which can be irrigated, the proportion which cannot be irrigated is very much greater. Hence, the need of determining what can be done on the land that has a slight rainfall is very great. In the arid regions in the United States, within the last few years, much useful work in this way has been done. It is known that some varieties of grain do well in dry districts and produce large crops. This is the case with the Macaroni or Durum wheats, which grow well with a very limited supply of water, and no doubt other varieties and other crops will be found, which can be grown to advantage under such circumstances.

By Mr. Jackson (Selkirk) :

Q. Is the farm bare of timber ?

A. Yes, it is just a bare plain.

Q. You will experiment with trees, I suppose ?

A. Yes ; we propose to plant trees of many different sorts so as to learn what trees and shrubs are best adapted for the conditions of climate found there, and to conduct these experiments on both irrigated and unirrigated land.

By Mr. Wright (Renfrew) :

Q. How long have you had that farm ?

A. It was selected last August and the first furrow was ploughed on it when I was there during the last week of August.

By Mr. Thompson :

Q. Did you ever try experimenting with alfalfa in the East ?

A. Yes.

Q. Will it grow on lands that are irrigated ?

A. Yes, we have grown it quite successfully on the Central Farm, also with some success at Brandon, Man., and at Indian Head, Sask. Sometimes the winters are hard on it. That was the case last winter.

Q. So it cannot be grown as a permanent crop here ?

A. I would not like to offer any positive opinion on that at present.

Q. I have seen that plant in the West, and it is marvellous what it will do.

A. We have had it growing here for several years in succession and in some spots it has survived the severest winters.

Q. In the West it is the chief fodder grown for sheep and cattle ?

A. Yes.

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Q. Where they irrigate ?

A. Yes.

By Mr. Wright (Renfrew) :

Q. When I was through the West I saw some magnificent crops of alfalfa.

A. It grows very well in some parts of British Columbia.

By Mr. Thompson :

Q. In that western country it is a long-lived plant ?

A. Yes, it is a very deep-rooted plant and produces several heavy crops each year.

By Mr. Wilson (Russell) :

Q. We found that the way it was killed out in this country was by pasturing it a little too closely in the field ?

A. Yes; it is liable to be injured in that way, and we have much to learn in regard to the growing of alfalfa. Last year a bulletin was published at the Central Farm on this subject, covering all the particulars we were able to get together as to the success which has attended the sowing of alfalfa in different parts of the East, as well as in the West, and the most successful methods of cultivation.

Of course we propose also to go into fruit growing quite extensively at the Southern Alberta farm, as the climate there is said to be rather more favourable to fruit production than it is in the north.

By Mr. Smith (Oxford) :

Q. Speaking of dry farming, do you propose to follow what is known as the Campbell system ?

A. Yes; and also to test the improvements said to have been made on the Campbell methods. There are some special implements used on the land, under such circumstances, which will be carefully tested. There is an implement called a packer which is very much used in dry countries. There are several different sorts of these, and it is said that by their use the loss of moisture from the land can be greatly lessened. These and many other things will be tried.

LACOMBE FARM.—Another experimental farm is to be located at Lacombe, in Northern Alberta. The negotiations for a site of one hundred and sixty acres are not entirely completed, but it is expected they will be in a few days.

By Mr. Chisholm (Huron) :

Q. Irrigation causes so much evaporation that it might benefit the other areas of unirrigated land and cause more of a rainfall ?

A. That is quite possible, and the larger the area covered by the water the greater the probability of its producing this result. Irrigation may also influence the adjacent lands, through the moisture gradually permeating through the soil. In choosing the site for the farm at Lethbridge the selection has been made with the view of gaining information on this point. The land which is to be used as the dry farm rises sufficiently above the level of the irrigated land, so that it is not likely the water will find its way sufficiently into the soil to interfere with the results obtained, so that a comparison with crops from other farms that are distant from water is likely to be a fair one. All such things have been carefully thought over, and while we cannot possibly say yet what the effect may be of having water on one hundred acres of land for some years or what effect that may have on the three hundred acres adjoining it, we shall have to study these questions out.

Q. My idea would be this: If about one-quarter of that whole arid surface was irrigated, it would certainly increase the amount of evaporation, and the other three-quarters of the area would be greatly benefited by the increase of rainfall?

A. Yes, one might expect that; but the proportion of irrigated land will be much less than one-quarter of the whole. Where evaporation is greatly increased, and the water goes into the air, it falls later somewhere, and as likely as not it may fall in the neighbourhood.

By Mr. Wright (Renfrew):

Q. Has it had that result in Colorado?

A. I have never heard that point discussed.

By Mr. Jackson (Selkirk):

Q. Or in California the southern part of which is irrigated?

A. I do not think there has been any marked increase in the rainfall there, or some attention would have been drawn to it. I should expect more effect probably from the soakage of water underneath, than from the increase in rainfall.

In Northern Alberta, the tests to be carried on will be much like what we have been doing at the other western farms. As the climate is considerably different, the lines of experimental work will likely be somewhat modified, to suit the conditions. The character of the soil is also different, and the testing of very early maturing varieties of cereals will be a very important line of work there. Everything, however, that will tend to make farm life there more desirable to settlers, and more attractive to outsiders, will be tried, so as to determine the possibilities of the country along all the different lines of agricultural, horticultural and arboricultural work.

Q. How far is the farm from Raymond?

A. Which, the Lethbridge farm?

Q. Yes.

A. About twenty-five miles.

Q. South?

A. Yes; almost directly south.

By Mr. McIntyre (Strathcona):

Q. It must be one hundred miles?

A. Do you mean Lethbridge?

Q. I beg your pardon.

A. I have driven from Lethbridge to Raymond several times, and I do not think it is more than twenty-five miles.

By Mr. Jackson (Selkirk):

Q. Mr. McIntyre means the northern farm?

A. The farm at Lacombe? That must be several hundred miles.

By Mr. Wright (Renfrew):

Q. Have you got only a quarter section of land at Lacombe?

A. That is all. It is not thought necessary that these new branch farms should have a large area of land. It is not intended at present to keep stock, but to have them large enough to carry on everything in the way of agricultural work that will promote the growth of the country, such as raising of grain crops, fodder crops, fruit trees, shrubs and so on. Everything likely to be of use to the farm is to be tested, and the conditions of the district, as to its being favourable or unfavourable for the growth of such crops will be made known through the departmental bulletins to be published.

By Mr. Jackson (Selkirk):

Q. Have you ever had under consideration the starting of a farm in eastern Manitoba, where the conditions are altogether different from those at the Brandon farm?

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A. Yes, I have often thought of it; but the country is so very large, that it is not possible to reach in a short time all the districts which need help. I suppose you have reference to the Dauphin country?

Q. I mean Dauphin, Selkirk and Provencher—the whole of the country east of the Red river, east and north?

A. The Red river district is a peculiar one in itself, and the sub-soil is also peculiar. There is no doubt that an experimental farm would be very beneficial in any part of the country you have referred to.

By Mr. McIntyre (Strathcona) :

Q. Is it not intended to locate a farm in Northern Alberta?

A. The Northern Alberta farm is being located at Lacombe.

Q. I mean in the Peace River country?

A. No action, so far as I know, has yet been taken in that direction, and the need does not seem to be pressing there as it does in the more thickly settled districts. The situation at Lacombe will be fairly representative of the Edmonton district, and probably of the country as far north as Athabasca Landing. Beyond that the agricultural possibilities are not very well known. There has been a good deal of grain grown about Vermilion in the Peace River country, which seems to be a very good district, but I do not know of any proposal as yet to establish an experimental farm there. Negotiations are nearly complete for the establishment of one on Prince Edward Island in the East, and it is probable that work will be begun on that before very long, possibly sometime during the coming summer. Northern Saskatchewan has also been visited. Several weeks were spent there last summer with Mr. Mackay, the superintendent of the Indian Head farm, inspecting many localities to find out those most promising and suitable. The soil in these several places has been carefully examined and notes taken as to the advantages of each district. The Minister of Agriculture has come, I think, to two very wise conclusions in regard to the location of these farms. One is that they must be within sight of the railway passing through that part of the country, so that the passengers by every train will be able to see the farm and observe some of the work in progress. The other is that they must be within walking distance of the station in the town near which they are located, so that farmers visiting the experimental farm will not have to hire a conveyance in order to go out and inspect the farm.

By Mr. Wright (Renfrew) :

Q. That will be an object lesson with reference to the Central Farm here?

A. The other farms are all nearer than the Central Farm.

By Mr. Jackson (Selkirk) :

Q. How does that apply to the Brandon farm?

A. The Brandon farm is within a mile and a half of the post office, and if we get within that distance it is thought that most of our farmers would find no difficulty in walking that far.

Q. Can you see the Brandon farm from the train?

A. You can see most of it from the train, although at that distance the work in progress cannot be seen very distinctly. The Indian Head farm is alongside of the railway and about half a mile from the town. The farm at Agassiz is also alongside of the railway. At Nappan, Nova Scotia, the railway runs across a part of the farm.

The quarter section at Lacombe is beautifully situated in that respect, and at Lethbridge the line runs through the farm and will be plainly visible to passengers on the trains. It makes a great difference in the influence exerted by any institution as to whether or not it is continually under the public eye. It will be a great advantage to have the farms so located that people can see what is going on every day in

the year. This will induce people to talk about them and that will help the progress of the institutions very much.

By Mr. Henderson :

Q. Is it not a fact that at the Indian Head farm you have planted rows of trees around to prevent the public in driving along from seeing the farm ?

A. When work was begun there not a shrub or a tree could be seen as far as the eye could reach. Every effort was made to promote tree growth so as to provide satisfactory shelter. Moreover, the superintendent thought it was a good idea to have avenues of trees and windbreaks planted here and there throughout the farm, and now they have grown to a good size. It has become so wooded that when you are on some parts of the farm you have no idea that you are on the prairie at all.

Q. When I was at Indian Head I was ambitious to see the farm, but I could not see it, because there was so many trees interfering with the view.

A. There are about 120,000 trees growing on that farm now, and every road is bordered with them. There is no difficulty in seeing the crops when driving along the avenues, and there is nothing to prevent a good view from the train along the front. That is, you can look over the trees. They are not high enough to prevent a view of the ground, and you can see the buildings and part of the crops. This wooded appearance is such an entire change from the adjacent sections that no one going through in daylight is likely to pass the experimental farm without seeing it and that is one of the best advertisements we could have.

I think, gentlemen, that is all I intended to bring before you. I thank you very much for the kind hearing you have given me, and I shall be very glad to do all I can to carry out the suggestions the members have been good enough to make.

By Mr. Kennedy :

Q. Would it not be a good idea to have at the experimental farms large sign boards that could be read from the train very easily ? I know that when travelling on the trains I have had to tell passengers who were alongside of me, and who had never been through the country before, where the different farms were. They were always very anxious to see them, and would have passed without knowing where they were, had I not told them.

A. That has never been suggested before. The farm at Indian Head seems to be well advertised by the trees growing on it, and at Brandon the farm is too far away to permit of any one reading a sign. At Agassiz it might be useful. I am sure it is a suggestion worth considering.

Q. Take it at Agassiz, a great many strangers from the other side visit Harrison Hot Springs and go right past the farm ?

A. At Agassiz I think it might be desirable, because there the frontage of the farm along the track is not so long and they all stop at the station which is opposite the farm to go down to the Harrison Hot Springs.

Q. Once they get to the Springs they soon hear about the farm, but they might pass it going out and not know anything about the place, whereas, had they known of the farm, they might have had time to go over the grounds ?

A. Yes. I thank you very much for the suggestion.

Having examined the foregoing transcript of my evidence, I find it correct.

WM. SAUNDERS.

Director, Dominion Experimental Farms.

THE MACDONALD MOVEMENT FOR RURAL EDUCATION

HOUSE OF COMMONS,
COMMITTEE ROOM No. 34,
OTTAWA, WEDNESDAY, April 3, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 10 a.m., Mr. McKenzie, Chairman, presiding.

Dr. James W. Robertson, Principal of the Macdonald College, Ste. Anne de Bellevue, Quebec, attended by request of the Committee and made the following statement :—

Mr. Chairman and Gentlemen,—I am very much obliged to this Committee for the opportunity of laying before its members some information regarding the Macdonald College, and what has become known in Canada as the Macdonald Movement for the advancement of agriculture and education. Many of us look for much benefit from them to the whole of Canada. I gratefully recognise that in the past, when I had the honour and privilege of being Commissioner of Agriculture and Dairying for the Dominion, this Committee gave me many opportunities in its meetings and in its reports of laying before the people of Canada some of the plans which the Department of Agriculture had under consideration for the promotion of agriculture ; and I am venturing to hope that the Committee will let me, in my new capacity as Director of the Macdonald Movement and the Macdonald College, continue in the same friendly relationship.

SOME PROBLEMS AND EXPERIMENTS.

Some of the problems which we Canadians have to face and solve for ourselves are common to all self-governing nations, but others of them are peculiar to us. For instance, there are special national problems due to our youth ; to our size ; to the character, vastness and potential values of our undeveloped resources ; and to the large amount of foreign blood pouring into our citizenship. The large inflow of foreigners who come to mix with our people adds difficulties to the ordinary problems of agriculture and of education. These people bring in not merely different methods of doing things but different social standards and ideals. The traditions they have inherited, the conditions under which they have been brought up, their outlook on life, these are all different from ours. For our safety and their welfare it is necessary that these people should be so educated, so led and so guided by competent leaders that they will be inclined to live on the land, and not to herd in the cities ; that they will be able to live on the land with profit and contentment to themselves and thus join our own people in making our civilization progressive and wholesome for the whole of us.

To help in the solution of some of the problems arising from those conditions is part of the work for which the Macdonald College has been founded and endowed by Sir William C. Macdonald, of Montreal. We are all making experiments ; we are doing that to the extent to which we live in a way that is consciously rational, trying to do the best we can with ourselves and the conditions in which we find ourselves.

We are trustees of life, and of the institutions and national honour of Canada, as well as of the immense natural resources of the country. With the highest appreciation of the work of this Committee and of the Parliament of Canada, it remains to be said that many of our efforts in government are still only experiments. Even our form of government, as yet, is only on trial. We have much to learn; much to find out by patient, careful trials in agriculture and education and government, and withal we have reason for some satisfaction in that we are making genuine progress. We are making progress towards having the will of the people prevail in an intelligent way with integrity, with justice, with courage and good-will. Out of our experiments in those matters there are embodied into laws and institutions and customs what we as a self-governing people think to be desirable and good, leaving these flexible and serviceable for further adjustment to new needs.

It has taken the older nations many centuries to learn how to manage their soils in order to get the most out of their climate. That the climate is one of the chief factors in profitable agriculture is sometimes forgotten. It has taken the older countries centuries to accumulate what one may call agricultural and industrial intelligence as applied to rural life. To make up for our youth in those respects, it is necessary that we should do more for the young people who are looking towards agriculture than we have been doing for them, or than has been done for them in any country so far. I think adequate educational and training work is not being done in this or any other country for the young people, looking towards a rural life and agriculture. What to do, and how to do it, are parts of the national problems. It appears to me that the solution of problems in agriculture for prosperous, beneficial rural life are inseparable from progress in education, including agricultural and industrial education. The sure way to increase the wealth and well-being of the people is by the application of intelligent labour, and the quality of intelligence in labour is one of the fruits of some form of education. Instead of standing still and grumbling at what is not, but what might be, it is worth while trying to improve the conditions and to solve the problems which confront us by doing the something which we believe to be right and best and by observing the results of our efforts. All rational progress is attained by learning the lessons from consequences.

THE MACDONALD MOVEMENT.

Permit me to lay before the Committee a brief statement of some of the consequences from some of the efforts which have been made in the Macdonald Movement. I think you will join me in seeing that our efforts have been on the right lines, and that much more can be done in the same direction with great benefit to all the people. Some people look for consequences to come in a capricious sort of way. In agriculture there is no room for caprice; there is the inevitable consequence from every adequate cause. Good crops do not come by chance, and bad weeds are not banished by wishing them away. Take an illustration of this in a rather large way from what has happened in parts of the province of Quebec, not far from where the Macdonald College is located. Many years ago the people were beguiled into the easy-going farm practice of growing and shipping hay; the United States markets were close by and attractive. I could take you in the province of Quebec across vast areas in the St. Lawrence valley which were as fertile in soil possibilities and much more so in regard to the climate than the highly-lauded prairies of the west. Areas immensely superior as places for permanent homes, because of the soil, the climate, the trees and the abundance of pure water. The farmers on those areas in Quebec kept on growing and shipping hay, growing and shipping hay, growing and shipping hay, until those fine stretches of alluvial soil are now yielding less than 1½ tons of hay per acre, and that often of rough and weedy quality. Such land is being gradually impoverished without enriching the people in pocket or in agricultural, industrial or commercial intelligence and ability. The hay from 200 acres when sent out of the

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country carries away more of the elements of fertility than the whole \$6,000,000 worth of butter exported from Canada last year. Do you catch my point? A crop from 200 acres of land shipped out of Canada in the form of hay depletes the soil of the country more than the whole \$6,000,000 worth of butter exported last year. Do we not need more education, more agricultural education, more industrial education for the management of the land of this country? The condition which I have mentioned does not prevail over the whole of Quebec. It is not quite so bad in many parts of Ontario, but a similar condition will inevitably prevail over the prairies of the west, and with much more disastrous results, unless the farmers on those lands, especially the newcomers, are informed and trained how to make the most out of the land without robbing it; how to get the best of crops with regularity while keeping the land reasonably free from injurious weeds. If the land of the west becomes harried and impoverished like some of the lands in the St. Lawrence valley woe betide the west. It has nothing else to fall back on.

For the whole country, then, as a matter of protection, safety and insurance, it behooves us to look well to the training of the young people towards rural life, and to look well to the training of leaders for them. The Macdonald Movement, as helped by Sir William C. Macdonald, has nothing destructive in it. It does not desire to destroy anything that now exists in rural districts, except weeds, but it hopes to help in building up something better than is now known and done, and thereby displace what is poor. It aims at helping the rural population to understand better what education is and what it aims at for them and their children. It plans to help in providing more competent leaders for the horticultural and agricultural population. Somebody's watchfulness, somebody's thoughtfulness, and somebody's thoroughness are always required; and the progress of the people in all worthy ways can be increased in what might be called geometric ratio through intelligent leaders who possess and use such qualities with unselfish public spirit.

SOME RESULTS FROM AGRICULTURAL EDUCATION.

Let me offer you briefly a few instances. The dairying industry is the rural industry in Canada which has been helped most by organized educational effort. It is not the only one that needs it, and it is not the only one that would respond to and profit by it, but it is the one which has had the advantage of organized educational effort for the longest period. Twenty years ago the value of the exports from Canada of butter and cheese was about seven and a half million dollars, whereas the value of the exports of those products last year was over thirty million dollars. There is no part of agriculture that would not respond as fully as the dairying branch has responded. The benefits are not only in the improved quality of the products, in the increased volume and value, but also in the heightened and deepened intelligence of those who are engaged in dairying. The dairy farms of to-day yield more than they did fifteen years ago; the very opposite is true of the hay fields of Quebec which I mentioned a moment or two ago. Besides, there is the intellectual and social alertness of the people. In the one case you have comparative isolation with the least intelligent kind of labour on the land; in the other, you have co-operation at creameries and cheese factories, and the development of business methods and business ability which bring the farmers into association with the manufacturing and transportation interests of the country. I need not pursue that illustration further.

Another instance of the same kind of thing might be taken from the experience of Denmark. Shortly after I had the honour of being appointed a public servant, to help in this forward movement for agriculture and education in Canada, some twenty-one years ago, I paid a brief visit to Denmark. I saw and learned very much there from which I tried to bring back the lessons to the Province of Ontario. At that time the people of Denmark were developing organized industrial and agricultural education for the grown people and for the young people who were to follow

rural occupations. One of the means which they used in later years was what are called 'Co-operative Testing Associations.' These are associations wherein a number of farmers unite to test their milking cows, to discover the most economical methods of increasing the yield of milk, improving the quality of the milk and reducing the cost of production. As a result of three years' work at one typical co-operative testing association, viz.: that of Farrup, the farmers increased the yield of milk per cow by 942 pounds per annum, or 18 per cent, and increased the yield of butter per cow by 47 pounds per annum, or 24 per cent. In the meantime, they managed to improve the methods of feeding the cows, and thus reduced the cost of production. This little kingdom of Denmark, with a population slightly less than that of the province of Ontario, sends to the United Kingdom some of the same sorts of agricultural products as Canada, and takes out of the English markets on an average over eight million dollars a year more than any other country gets for the same quantity of butter, bacon and eggs. That is the premium obtained by the Danes for superiority of quality and condition; the premium for the adoption of industrial and agricultural education. That amount would pay the rural school bill for all of Canada at the present time. The large and wealthy province of Ontario spends some three and a half million dollars annually on all her rural schools, and the kingdom of Denmark takes out of England over eight million dollars annually as a *premium* for superior quality on butter, bacon and eggs. The rural population has been educated towards ability, towards intelligence in regard to rural life, and towards the development of a public spirit which makes for successful co-operation. There are material gains and very much besides.

I recognize that industrial and agricultural education is not all of education; and it is not something different and apart from the more general education given in schools and in colleges as well as on farms, in factories and in offices. It is really a part of life in training for a profitable and enjoyable life. As related to agricultural operations, its problems are two-fold, viz.: those on the side of the business or industries of agriculture and the adult people who are engaged in them, and those on the side of the children who are to follow the occupations when they grow up.

The purpose of agricultural or industrial education is on the one hand to impart, and on the other to acquire useful and usable knowledge pertaining to the conditions, processes, operations, management and organization of the affairs of everyday life, with training in the use of such knowledge in order to develop skill and to secure the benefit of mental, moral and artistic discipline through the acquisition and use of such knowledge.

SOME RESULTS IN EGGS.

Let me cite another instance of the benefits from agricultural education and development which may shed more light on this matter. Some years ago I had occasion to lay before this Committee some information and suggestions in regard to the improvement of the poultry business, particularly in respect to the fattening of chickens. Out of the work undertaken in that regard there grew a few-breeding stations for the improvement of chickens for fattening purposes, and for the advancement of agricultural education as applied to the poultry business among the farmers. At the Macdonald College we now have some 250 pullets purchased last autumn (1906) from two of these poultry stations which had been maintained by the Dominion government. The pullets which we obtained were the selections of the fourth year from hens which were good layers during the winters, and which had vigorous constitutions. At Ste. Anne de Bellevue we have a climate not any milder than that of Ottawa. For our poultry department we have erected one good substantial fire-proof building for office class-rooms, judging room and incubator rooms. I have never seen any buildings at any of the great institutions, devoted to the improvement of agriculture and the advancement of agricultural education, which are nearly the equal of ours at

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Ste. Anne's; and the poultry buildings of the Macdonald College match the others for their purposes, particularly for the students who will take the short or long courses. The fine buildings are for the students. But it does not follow that we should put hens in fire-proof buildings and heat those also by steam or by stoves. We put the hens in small colony houses. The largest of these are 20 feet x 14 feet x 7 feet high. These accommodate from 50 to 75 hens each. We have smaller colony houses, 12 feet x 8 feet x 7 feet high, which serve for 25 hens each. These colony houses stood unsheltered in an open field all through the winter. They are constructed of wood, one board thick, except at the end where the roosts are placed, and there there are two thickness of inch boards with tar paper between. Our 250 pullets did not get into their quarters until some time in November. They began to lay a few eggs on the 19th November, and kept on improving on that all winter. As I have said, the colony houses are only one board thick, and occasionally the thermometer inside the house registered as low as 18° below zero.

The hens never got any cooked food or any troublesome mash; they got no concoctions with pepper in them—I think pepper is the hen's whisky, and whisky does not make for good products. These hens are fed once a day on a mixture of dry grain, containing wheat, oats, barley, buckwheat and corn. That is thrown on the floor which already has a depth of three or four inches of cut straw and roughage. The hens have access to a small trough at the bottom of a hopper containing either bran or crushed wheat. They have also access at all times to grit, oyster shells and meat scraps from the packing house. The winter was an exceedingly severe one. When the weather became cold and the water was frozen up in the colony houses, we stopped supplying water and shovelled in snow instead. These are the simple conditions under which these 250 hens have spent the winter at the Macdonald College. You will have come to the conclusion, to which others jumped, that we did not get many eggs, and that the hens suffered from frozen toes and other injuries.

Before mentioning actual results let me tell you of an instance of another sort which came to my knowledge within the last few days. I was showing a citizen of Quebec over the poultry department. He lives in the city and owns two good farms in the province. He said he had about 100 hens on each farm. His expression was: 'It was an awfully severe winter for hens; we did not get much more than 100 eggs all winter.' That was said by him at the end of March. He had had 200 hens in good warm places, fed in a very painstaking way. At the Macdonald College, as a result of industrial and agricultural education, the result of lessons in consequences, a result of trials to find out what to do and how to do it with the best results, we had 250 hens in these small colony houses scratching for their dry food, fed once a day and picking snow. As I have said, the thermometer ran down occasionally to 15° and 18° below zero Fahr. In the severest weather a cotton curtain was unrolled at night in front of the perches. The hens had no other protection beyond that and the one-board thick colony house. There was no sickness except in the case of two hens which the man in charge told me dropped off the perch from apoplexy, being too fat. These two were not laying any eggs. But in the case of the other hens, while everyone did not lay during the winter, we obtained between the 19th November and the 31st March over 10,000 eggs—to be exact, 10,122 eggs. In the coldest weather we got about six dozen eggs per day, and have been getting about 150 eggs per day in the milder weather. Then, when we put the eggs from these hens in the incubators they tested quite high for fertility, the range being from 93 to 76 per cent fertile. The feed consumed by these 250 hens during the winter cost altogether \$117. These hens are the product of four years' selection, and in the four breeds kept there is not much difference in the results obtained. Twenty-five Rhode Island Reds laid on an average 51 eggs per hen; 25 Buff Orpingtons, 40 eggs per hen; 100 Plymouth Rocks, 40 eggs per hen, and 100 White Wyandotte, 39 eggs per hen, between the middle of November and the end of March. Two hens laid 83 and 85 eggs respectively. Seventy hens laid over 50 eggs each. Fifty-three laid less than 20 each, and thirteen did not

lay any. Some of them had not responded to the industrial and agricultural education which had been provided. I do not think there is a single department of agricultural work in Canada that will not respond as well as these hens on the whole have done. That is the sort of thing that the Macdonald College is being established for. We are hoping that similar principles and methods will become effective in every department of agricultural and rural life.

By an honourable member :

Q. Did the hens get their feet frozen ?

A. Not a single hen got its feet frozen. A few of the cocks, White Wyandottes and Barred Plymouth Rocks, got the top of their combs nipped. There was not a sick fowl in the lot.

Q. What kind of light did you give them ?

A. We had one big window on the south side.

Q. Of glass ?

A. Of glass, and we can push that back and leave a wire screen in position. We have allowed the window to be open nearly every day all winter.

By Mr. McLennan :

Q. What is the best food for them ?

A. The feed for poultry, if you want to get eggs, should be particularly strong in grain, like wheat. We give wheat, oats, barley, buckwheat and Indian corn, throwing it on top of the straw so that they have to scratch for a living. They do not do that for amusement ; they have actually to scratch to get their living.

By Mr. Findlay :

Q. When it is 18 degrees below zero how do you keep the eggs from freezing ?

A. That is also done without trouble. I do not know that the ordinary farmer would do it, but our man and hens did the work first-rate. We have two rows of trap nests along one side ; after the hen gets in she cannot get out until released. The man goes around twice in the forenoon and lets the hens out. He sees the number on the band of the hen's leg, and pencils it on the egg. The hen sits on the nest until released. It was rather a bother at first, but it works well. We get the record of the hen and she protects the egg. A record can be kept of every hen.

By Mr. Ratz :

Q. Do you have a man there to lock the hens in ?

A. There is a little wire door on a hinge in front of the ordinary nest. The door is pushed inward by the hen, and after the hen has got in, it falls back into place and fastens itself by a drop wire.

By Mr. Derbyshire :

Q. As I understand, you watch the chickens as they come out of the shell to see if they scratch ? If they do scratch you raise them, but the other pullets you do not ; you punish them ?

A. We would not be so unscientifically harsh as that. The only ones we do punish ultimately—which perish finally—are those that do not lay eggs for a long period. Their numbers are not recorded in our book of eggs. They are not what we desire to perpetuate ; we let them drop out. We select those which have elected themselves into the book of eggs.

By Mr. Blain :

Q. What kind of fowls are they ?

A. We keep four breeds. Barred Plymouth Rocks, White Wyandottes, Rhode Island Reds and Buff Orpingtons. Those we find to be useful fowls for all purposes

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—for laying and for fattening also. We shall add other breeds for instruction purposes. If you will come and see us at Ste. Anne's you will find a lot of things that are interesting. I hope the Committee will do us the honour of holding a session there next autumn or next spring.

By Mr. Schell (Oxford) :

Q. How many pounds of grain do the 250 hens consume in a day ?

A. I have got the exact figures here. They consumed altogether from 1st of November until the end of March :

Mixed grain (wheat, oats, barley, buckwheat, corn)	6,100 lbs.
Wheat bran	1,000 "
Skim-milk	200 "
Beef scrap	300 "
Grit and oyster shell	300 "
Mangolds	(Not weighed.)

Q. That is from November until March ?

A. From November until March it cost us \$117 for the grain, grit, beef scrap, oyster shells and the skim-milk, and we sold about \$320 worth of eggs. We could have sold at higher prices. The price was 25 cents a dozen to our own people on the place and 50 cents to city people. We will do better when we are fully organized in reducing the cost of feed, in getting more eggs per hen and in the price.

SEED GRAIN COMPETITION.

Another striking instance of the result of industrial and agricultural education under the Macdonald Movement came from the Macdonald Seed Grain Competition. As direct and indirect results of that competition there has been a remarkable development in the cultivation and systematic selection of grain of high quality for seed. The Seed Branch of the Department of Agriculture itself was a direct outcome of the Macdonald Seed Grain Competition, as was also the formation of the Canadian Seed Growers' Association. As far as I can learn from the officers of the Seed Branch of the Department, before the Macdonald Seed Grain Competition was instituted there was not known outside of the experimental farms more than some 360 acres of reasonably pure Red Fife wheat in the fields of Manitoba and the Northwest. There was plenty of No. 1 hard wheat for marketing, but the seed grain had become mixed. Last year it was reported that there were over 34,000 acres of reasonably pure Red Fife wheat growing in the Canadian west. That is surely a great gain in itself. From that area it should not be difficult in the course of a few years to have the whole of the west seeded in wheat true to name and true to strain. It is highly important for Canada that the reputation of the west for grain of superior quality should be maintained in the markets at home and in the markets abroad. By careful selection the rapidity of increase may be marvellous.

With Mr. C. A. Zavitz, Professor of Field Husbandry at the Ontario Agricultural College, I followed a case where he planted one specially selected seed in 1903—I saw an acre of barley from that seed growing in 1905. Two other remarkable instances of the improvements by Mr. Zavitz may be named here. For twelve years he had selections made of Joannette oats; on the one hand there was selected seed, large, plump and of dark colour; on the other hand, there was selected seed, thin, light and of light colour. A similar selection from each crop as kept year by year for twelve years.

The result was that at the end of twelve years the crop from the large, plump, dark-colored seed yielded 26.1 bushels per acre more than the crop from the light, thin seed of light colour. The condition of soil and weather for both crops were alike. Moreover, the grain from the large, dark-coloured seed weighed 10.5 pounds per bushel more than the other.

The Macdonald Seed Grain Competition grew out of the work done to extend manual training in the public schools of all the provinces of Canada.

MANUAL TRAINING CENTRES.

Sir William C. Macdonald furnished funds to establish manual training centres in connection with the public schools in twenty-one places from Prince Edward Island to British Columbia, and to maintain them without cost to the pupils or the public for a period, in most cases, of three years. At first special teachers of ability and experience were brought in from outside, mostly from England. Some twenty-seven manual training teachers were thus brought into Canada. As time went on Canadian teachers were trained and became duly qualified. Before the end of the period of maintenance by the Macdonald fund, there were forty-five manual training teachers on the salary roll at a cost of some \$3,600 per month, and more than 7,000 boys were taking the courses. Summer courses were provided for teachers of urban and rural schools. In the cities on Saturday forenoons, or at some other convenient time every week, classes were arranged for the teachers from whose rooms the boys went to the manual training centres. In Ottawa these classes were attended by over ninety teachers, and in Montreal and in Toronto by over a hundred in each place. This work was begun seven years ago, and in 1903 (in Montreal in 1904) the local authorities in the several provinces took over and extended the work. The equipment was presented free to the school boards, and in the case of the Normal schools to the provincial governments. Now over 20,000 boys and girls in Canadian schools receive the benefits of manual training in their regular course under the school authorities as a result of Sir William's benefaction in giving that form of industrial and agricultural education a good friendly lift.

I cite the following from a former report I made to indicate the true character of manual training lest some one should suppose that its purpose was to make carpenters or young men skilled in woodwork, admirable as these two forms of ability are in themselves. 'Manual training develops in children habits of industry, and leads them thoughtfully to adjust their acts to desired ends. It begets a sense of responsibility, in response to which the child rises to the exercises of its powers in sustained efforts suited to its strength and intelligence. It brings about the mental habit of appreciating good work for its own sake, and is quite different from that sort of education which consists in informing the pupils about the facts within a definite area of knowledge in order that they may be able to pass examinations on the subjects included within it. The so-called dull boys, who are not quick at book studies, have in many cases been found to show great aptness in the manual training part of education. It prevents them from being discouraged with school life, and from feeling any sense of inferiority to the quick children. It gives them habits of carefulness and makes them self-reliant, hopeful and courageous. All of these are manifestly most desirable educational results. It is also a soothing and strengthening corrective to the quick and excitable children who become over-anxious about examinations on book subjects.'

'The glow of satisfaction from having done something well with one's own hands has certain stimulating and strengthening effects. Is it not the same as that which is revealed by the sacred historian when he wrote "And God saw everything that He had made, and, behold, it was very good." It is a good thing to let boys and girls become partakers of this divine joy in their own work. The happiness which springs from the consciousness of having begun and finished a piece of good, useful work by one's own labour, is more than a mental and physical tonic. In large measure it allies the worker with the Power that maketh for righteousness. It gives power to overcome obstacles, and the power to overcome obstacles in the path of material, mental, moral and spiritual progress is perhaps the most desirable quality which can be acquired through education. "Train up a child in the way he should go, and when he is old he will not depart from it."'



MANUAL TRAINING IN WOOD, MACDONALD CONSOLIDATED SCHOOL, KINGSTON, N.B.

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SEED GRAIN PRIZES.

Out of the Macdonald Manual Training Fund came the Macdonald Seed Grain Competition carried on by boys on farms dotted all over Canada from the Atlantic to the Pacific. The main purpose of this movement was to improve the crops of Canada by encouraging the general use of seed improved by selection from varieties of which the product is in demand or has a relatively high market value. The use of such seed increases the quantity of produce per acre; makes the quality better, and thus renders rural occupations more profitable and the people who follow them more prosperous and more contented. In growing crops two fundamental principles should be recognized: 1. The relative measure of success with which crops obtain their food from the soil and the air is determined by their environment—their opportunities. These opportunities depend primarily on the climate or weather as well as on the soil, and are modified largely by cultivation, particularly by a suitable rotation of crops, by manuring and by drainage. 2. The relative measure of success with which crops obtain their food from the soil and the air is determined by the power of each individual plant to take in, absorb and assimilate food from the soil and the air, the power of the plant to overcome obstacles and the ability of the plant to do things in its own environment. A plant is a living and working organism. Its capacity to live and assimilate is largely determined by the source whence it inherited its qualities.

In the summer of 1899 I put aside \$100—my own money, not the public funds—to offer in prizes to Canadian boys and girls who would send me the largest heads from the most vigorous plants of wheat and oats from their father's farms, partly to learn whether the country could be got ready to accept the principle and adopt the practice, and partly to interest and educate the boys and girls. I had a wonderful response, and I paid the money in prizes with as much enjoyment as any money I ever spent. The letters I got from farmers and from their boys and girls were so suggestive and encouraging that in the following winter I went to my friend Sir William C. Macdonald, of Montreal, and said in substance: 'Here is a great chance to do some educational work in progressive agriculture; to do something interesting, something attractive, something definite, something beneficial to the whole community, something easy and yet with plenty of difficulties. Farmers and their families may fail to appreciate the educational advantages of a plan or scheme set out in a written statement, but here is something which would be so helpful and instructive to boys and girls that they would go on with it, and the habits of observation and thought and study would go on with them.' I told him \$10,000 for prizes would set and keep this thing going for three years. He provided the money with all good-will—my little \$100 come back a hundred fold—to offer as prizes to boys and girls to encourage them to carry out in practice the plan of selecting the largest heads of the most vigorous plants and growing seed from those heads on a plot by itself.

The yields from the crops of 1900 compared with those of 1903, on an average for all Canada for spring wheat, showed an increase of 18 per cent in the number of grains per hundred head, and 28 per cent of increase in the weight of grains per hundred heads. In oats the figures were 19 per cent of increase in the number of grains per hundred heads, and 27 per cent of increase in the weight of grains per hundred heads. These are results from several hundred seed grain plots operated by boys and girls. Altogether over 1,500 entries were received. Out of that number 800 completed in full the first year's work, and 450 of them completed the three years' work in a satisfactory manner. The operations of the competitors were inspected from time to time during the term; the parents of the 450 competitors who completed the three years' work were found, as a rule, to be among the best farmers in the localities where they resided. Ninety-two per cent of the reports said on behalf of parents and guardians that the quarter acre hand-selected seed plots carried crops decidedly more vigorous and heavy than the crops

from the same varieties of grain grown on the same farm in the same season from unselected seed. The plots and farms with these seed grain plots were visited in many cases by an official of the department. It was learned from them, from the operators themselves, and from neighbouring farmers, that the crops grown on these hand-selected seed plots were heavier and better, and that the plants in them were more vigorous than those produced on the other parts of the farm from the ordinary seed of the same variety without systematic selection. When results so notable as those can be gained by three years of intelligent labour, what do you think is possible in thirty years when this practice has become the common one through which to obtain seed for grain growing on the farms throughout Canada?

CANADIAN SEED GROWERS' ASSOCIATION.

Many of the farmers on whose farms the competition was carried on were formed into the Macdonald-Robertson Seed Growers' Association, out of which grew the Canadian Seed Growers' Association. Its third annual meeting was held in June, 1906, and the report of its proceedings contained a marvellous record of valuable public service. Particular information was obtained from leading members of the association. These reported several distinct and definite gains from the method of selection which had been followed by the members of the association, viz.: the size and quality of the kernels definitely improved; the strains of selected seed maturing more evenly; the strains becoming better adapted to local conditions; varieties being kept pure; the strains becoming more resistant to disease and gaining in productiveness. All these are highly desirable and give added value to the crops in every case.

I made enquiries last year from the Seed Branch of the Department of Agriculture and from members of the Canadian Seed Growers' Association. I gathered from their estimates that one of the direct results from the seed grain competition was an increase in the value of the grain crops of 1906 in Canada to the extent of at least of \$500,000. That is high finance for you. High finance by a man of lofty intelligence and spirit—5,000 per cent on an investment of \$10,000, and the best of it all is that Sir William Macdonald has not sought and did not receive a single dollar of return for himself from it. That is laying up treasures where neither moth nor rust doth corrupt and which goes on gathering and diffusing benefits for ever and for ever for the people.

SCHOOL GARDENS.

Under the Macdonald Rural Schools Fund arrangements were made for providing a school garden at each of five rural schools in each of five provinces. A trained instructor was placed in charge of each group of five gardens and of the nature study work at them. He spent one day at one school and the next at another. The cost of this was met by Sir William Macdonald. If the Committee will permit me I would like to add to my evidence for its printed report some information as to what these school gardens are beginning to accomplish in various places for agriculture. I think the information would be valuable to the public, and I think you would be interested in learning something of the work which has been done in this way. Therefore, with your kind consent, when going over the transcript of my evidence, I shall insert a little more information.

At the school gardens an effort is being made to give the children information and training in three important matters in connection with agriculture, viz.: The selection of seed, the rotation of crops and the protection of crops against disease and insects. It is really industrial education. Children find out something by doing, observing and recording the results themselves, and I say it over again that all worthy progress, in matters that are worthy of thinking about, springs from learning the



SCHOOL GARDEN, MACDONALD CONSOLIDATED SCHOOL, KINGSTON, N.B.

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lessons of consequences. As soon as a child understands that, and governs his life accordingly, he becomes a better pupil and the promise of a better citizen in every sense.

The school garden is one way of making rural life more popular as well as efficient. It may be the first step towards actuating the people to pay more to make the schools more efficient. The best education in rural schools should make the people like rural life and also enable them to make it more profitable. The best way to make any workman like his work is to make him understand it. The beginnings of all that and much more are laid in the schools.

I cite only a few instances of the results from the experimental plots in the gardens managed by the children themselves. In Prince Edward Island, at Tryon, the children obtained an increase of 32 per cent in the yield of wheat from a plot on which selected seed was sown as compared with a plot alongside for which the seed had not been specially selected. In Prince Edward Island, also, the children obtained a yield of 17 per cent increase in a barley field after clover, as compared with a plot alongside where no clover had been grown.

At most of the gardens two plots, side by side, were planted with potatoes under equal and similar conditions. The treatment of both plots was alike, except in regard to the spraying with Bordeaux mixture to prevent blight. One plot in each garden was sprayed with the mixture three or five times as the case might require, whereas the other plot was left unsprayed. In every case the yield of potatoes from the sprayed plot was larger than the other. The following list shows the increased yield resulting from spraying at six gardens:

Knowlton, Que.	111 per cent.
Richmond, Ont.	100 per cent.
Carp, Ont.	85 per cent.
March, Ont.	81 per cent.
Guelph, Ont.	43 per cent.
Brome, Que.	41 per cent.

I quote from an article written by Mr. R. H. Cowley, one of the foremost inspectors of schools in Ontario, who has been appointed recently as superintendent of continuation classes for the province of Ontario :

‘Three leading motives underlie the origin and growth of school gardens in Europe :
 1. To provide a convenient means of supplementing the teachers’ income, thereby simplifying the problem of maintaining the public school. 2. To promote a practical knowledge of horticulture and agriculture, thereby increasing the national prosperity. 3. To furnish means and material for the practical study of botany as a desirable department of scientific knowledge.

‘The vast majority of European school gardens look to utility. Of the few that recognize the importance of the educational end, nearly all stop short at the acquisition of a certain amount of scientific information and the habit of careful observation. On the other hand, the Macdonald school gardens, while designed to encourage the cultivation of the soil as an ideal life-work, are intended to promote above all things else symmetrical education of the individual. They do not aim at education to the exclusion of utility, but they seek education through utility and utility, through education. The garden is the means, the pupil is the end.

‘The Macdonald school gardens not only have a recognised place in the provincial systems of education, but they are attached to the ordinary rural schools, owned by the school corporations and conducted under the authority of the school trustees and the express approval of the ratepayers.

‘The work of the garden is recognized as a legitimate part of the school programme, and it is already interwoven with a considerable part of the other studies. The garden is becoming the outer class-room of the school, and the plots are its blackboards. The garden is not an innovation, or an excrescence, or an addendum, or a di-

version. It is a happy field of expression, an organic part of the school in which the boys and girls work among growing things and grow themselves in body and mind and spiritual outlook.

'The true relation of the garden to the school has been in good part established by the travelling instructors whom Professor Robertson appointed to supervise the work in each province. These instructors were chosen as teachers of experience in rural schools, and were sent for special preparation, at the expense of the Macdonald fund, to Chicago, Cornell, Columbia and Clark Universities, and to the Ontario Agricultural College, Guelph.

'The chief tools and implements requisite to the school garden are hoes, rakes, hand-weeders, garden lines, one or two spades and shovels, a wheelbarrow, hammer, saw, nails, &c. The pupils, as a rule, require only hoes, rakes and hand-weeders. Those pupils who are sufficiently mature to work a plot by themselves or along with a companion, can get along very well with hoes and rakes of the average size. In one case, where smaller tools were supplied, the pupils abandoned them after a little practice for those of the standard size.

'In the largest school, two hours' work per week by the pupils was found requisite to keep the garden in proper condition. In one school the enthusiasm was so great that the pupils did all their garden work outside the regular school hours. At this school, also, the garden did not suffer from neglect in the slightest degree during the midsummer vacation of six weeks. Experience indicates that when the gardens are fully organized the plots can be well kept by devoting two half hours per week to the work. This time is mentioned not as the ideal condition, but as an encouragement to those who may desire to start school gardens in districts where prejudices are likely to be met. The fact is that in the ordinary ungraded school, and for that matter in the urban school as well, the working power of the pupils is ill-sustained throughout the day owing to their merely forced interest in much of the prescribed work. An awakening as to the educational waste of our schools is coming, and when the school garden is seen in its true relation, it will have a period in each day of the school programme during the growing season. The children have ample time to spare, and the work of the gardens is promoting their intelligence and progress in the ordinary school course.'

Mr. E. A. Howes, who is now principal of the Macdonald Consolidated School at Guelph, Ont., had charge of the school garden nearest the city of Ottawa. I venture to include the following extracts from an article by him :

'Bowesville, Ont., which is situated six miles south of the Dominion capital, has long been regarded as one of the most progressive sections in the progressive County of Carleton, and it is to the active interest of its people in the welfare of their school that the credit for a large measure of the success of the movement here is due. They have never interfered but to aid. Land sufficient to make a school ground comprising two and one-half acres was purchased and this was enclosed by a neat fence with turned posts and attractive gates.

'The daily attendance at Bowesville school may be placed at approximately fifty children, ages ranging from six to sixteen. The plan of dual ownership of garden plots has been followed here, a senior and junior pupil having joint ownership in a piece of ground (ten feet by twenty feet), working in conjunction and making a just division of the spoils at time of harvest. This plan gets over the difficulty experienced when juniors are shouldered with the entire responsibility of managing a plot, while it does not destroy the sense of ownership which makes proud the juvenile gardener. In laying out and cultivating the garden plots the entire work, with the exception of the ploughing of the ground, was performed by the children, and, it may be added, cheerfully performed. Neighbouring farmers brought manure for the garden and ploughed the ground.'

'The experimental plots, belonging to the senior class, deserve special notice. Experiments in crop rotation, in the effect of clover growth, and in potato spraying

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have been carried on, and results carefully noted. Bowesville is the centre of the largest potato producing section in eastern Canada, so particular attention was paid to potato spraying experiments. In addition to the class experimental plots mentioned, three of the oldest pupils carried on an independent experiment in spraying. Care was taken that the crop received neither more nor less attention, other than the spraying, than did the crop in a neighbouring field. Rows of potatoes sprayed with Bordeaux mixture were grown beside rows receiving ordinary attention. When the resulting crops were piled side by side in the tool-house, showing an increase equivalent to more than fifty bushels per acre for the sprayed over the unsprayed crops and also a decided improvement in size and quality, the farmers sat up and did more thinking than would have been the case had they read of the same results in some agricultural publication. It is not so much what these plots teach as it is the trend of thought induced.

SCHOOL GARDENS IN CARLETON COUNTY, ONTARIO.

From report by Mr. J. W. Gibson, the Macdonald Travelling Instructor for School Gardens in Ontario :

‘There are five Macdonald school gardens in Carleton county—Carp, Galetta, Richmond, North Gower and Bowesville, and two others, No. 1 March and No. 16 Marlborough.

‘The time taken from the regular teaching hours is between one hour and one and one-half hours per week, or about 5 per cent of the school time. My experience goes to show that of their own free will the pupils spend much time in their gardens outside of school hours.

‘The pupils receive instructions along the following lines : Soils, plant foods (fertilizers), methods of planting and caring for flowers and vegetables, pruning and grafting of fruits, making and caring for hot-beds, transplanting, making and potting of cuttings, weeds and methods of destroying them, injurious and beneficial insects and means of combating the former, experimental work with plants, spraying to prevent fungous diseases of the potato, tomato, fruits, &c., &c.

‘The potato spraying experiment at the Carp garden this year gave an increase in yield of 85 per cent sprayed over unsprayed plots ; No. 1 March garden, 81 per cent gain by spraying ; Richmond garden, 100 per cent (just double).

‘The boys understand this work with Bordeaux mixture and it is now being introduced extensively amongst the farmers of these sections.

‘Written exercises in English and practical problems in arithmetic, done in the school and at home, are based upon the work in the school garden.

‘The teachers affirm that the pupils are more energetic and industrious in the school room as a result of their study of things out of doors. It has helped rather than hindered them in their final examinations.

‘NOTE.—As clerk of the entrance examination for the County of Carleton last July I made a note of the following results: From schools where no school gardens have been established, 49 per cent of the candidates passed. From the five Macdonald schools, where all the candidates have been engaged in school gardening for three consecutive years, 71 per cent passed, a gain of 22 per cent, and most of them with high standing.

‘The garden work has added new life and freshness to all school work and the teachers have benefited not less than the pupils thereby.

‘In these schools there is no longer that old-time tendency to destroy school property. The pupils have a new interest, a “proprietary” interest, in the grounds and buildings as well as in the garden.

‘Many of them are turning their knowledge of gardening to good account at home. Twenty boys and several girls in the Carp school alone last year started early plants for their home gardens in hot-beds of their construction. One woman told me

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that her son, ten years old, took complete charge of their home garden, and that they "never had so good a garden before."

'This work is conducive to the physical health and development as well as to mental alertness of the pupils. New teachers have noticed especially the latter characteristic in the pupils of the school garden as compared with the others.

'The moral influence of a properly conducted school garden cannot be estimated too highly. Indeed, they outweigh all others. Here children are trained to respect the rights of others—one of the first principals of good citizenship. They learn independence and industry. They develop a real love for the outside as well as inside the school house. They see more and think more than they otherwise would. They show a growing interest in and a broader sympathy for all living things. They are finding more pleasure and more profit, too, in the cultivation of the soil than they ever dreamed of. Many of these boys will soon be our leading farmers.'

W. H. Elliott, B.A., Vice-Principal Normal School, Toronto, Ont., reported :

From what I saw of the work in Carleton county in my brief visit, and from what I know more definitely of the work done at the Broadview Boys' Institute in our own city, it is my conviction that public school gardens are of inestimable value from a strictly educational standpoint, as well as from the more practical agricultural standpoint.'

The following extracts are from letters and reports received from teachers in charge of school gardens, Carleton county, Ont :

'The school garden seems to fill in the weak parts of our education for the growing child, as it tends to the moulding and developing of his character. I know that the general discipline in my room has been helped by the garden work and also that the pupils like their work in the school room better on account of it. If our politicians would try teaching school with a garden and then without one for two years as I have done, I am certain that they would be willing to grant all the financial support required ; yes, probably be too liberal with it.'

(MISS) M. YORK,
Richmond Public School.'

'My pupils are more observant than they were before we started school garden work and seem to acquire a clearer understanding of all their work. Mr. A—— told me that the school garden had been a benefit to his boys, and that they were more independent in their work both in school and out of school.

W. PETTAPIECE,
Principal North Gower Public School.'

'I am ready to put myself on record as saying that the school garden has relieved much of the drudgery of the school work to which I was always accustomed. This year we had our school garden and it has been the pleasanter year of my school work. I would never again pass a summer without a school garden. I consider that the chief value of the school garden lies in the effect which it produces on the moral tone of the school. The juvenile sense of ownership is the greatest insurance on the success of the garden and incidentally on the care of the whole school property. The garden is the central point of interest for this end of the township, and it is not unusual to have as many as a hundred visitors at the garden on one Sunday afternoon. I have noticed that the cultivation of flowers has received more attention in the homes since the advent of the school garden, and I am often consulted about this work. I have not heard any unfavourable opinion expressed by responsible persons in this community, but on the other hand the most progressive men have spoken highly of the garden work.'

E. A. HOWES,
Macdonald Consolidated School Guelph,
'(Late of Bowesville Public School.)'

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'It is impossible to overestimate the value of school gardening on our boys and girls. Instead of being detrimental (as at first supposed) to their advancement in the other branches of learning, it has had the opposite effect. Since engaging in the work my boys and girls have been first in all examinations, competing with children from other schools, including city schools. The whole tone of the school has been improved morally, socially and esthetically. Our boys and girls have now a reverence for life unknown before, and it has awakened in them, as nothing else could do, a deeper interest in all life around them. It has helped to make school life a pleasure. Now the boy makes the excuse to get coming to school instead of the excuse to remain at home. It has aroused the interest of the entire community. The parents take a pride in "the work of our boys and girls in the school gardens," and never fail to bring their visitors to see the work that is being done there. The pupils learn practical gardening and already their advice and assistance is often sought by parents and others interested in the cultivation of plants. Its influence is seen also in the homes of the pupils. Every home has its collection of house plants inside and its plots and flower borders outside. Our school board has come to realize the value of this work and are anxious to have it continued.'

G. A. MOORE,
Principal Carp Public School.

CONSOLIDATED RURAL SCHOOLS.

Four object lesson Consolidated Rural Schools were provided by the Macdonald Rural Schools Fund—one in each of the four provinces of Ontario, New Brunswick, Nova Scotia and Prince Edward Island.

They were located at places chosen or approved by the Provincial Departments of Education. In each case a new building was erected to take the place of the small schools which at that time were serving the single sections proposed to be consolidated. They were each equipped with ordinary class-rooms and an assembly hall, and also for manual training, household science and nature study with a school garden.

A consolidated school board was elected according to the school law of the province concerned. It manages the school as a part of the school system of the province. The school in Nova Scotia was opened in September, 1903; in New Brunswick, September, 1904; in Ontario, November, 1904, and in Prince Edward Island early in the summer of 1905.

The Macdonald Rural Schools Fund meets for a period of three years the additional expense of the consolidated school over the cost of the small rural schools which formerly served the locality. The school sections contributed exactly the amount of the former expenditure, and the extra cost is met by the Macdonald fund for three years to enable the people of four provinces to have those object lessons and experiments in education.

One teacher from each province was chosen in advance to become the principal of the consolidated school when established. They were formed into a class with the other teachers who were to be in charge of the groups of school gardens and sent on salary and at the expense of the Macdonald fund to receive special training at Chicago, Cornell, Columbia and Clark Universities in the United States, and also at the Ontario Agricultural College. Other excellent teachers were engaged by the consolidated school boards. One object of the consolidated being to fit nature study with school garden work, household science and manual training into a course of study with the hitherto ordinary subjects in such a way as to give the best possible education for rural life, teachers with such special qualifications were employed. That increased the cost of maintenance. The remarkable and great increase in the daily average attendance of pupils also prevented any reduction in the number of teachers required, such as has been the case in the United States. There, consolidation of schools has been effected to a considerable extent in some seventeen different states.

but without the improvement and enlargement of the courses by school gardens, household science and manual training.

The following table shows some of the statistical results from the first years of the consolidation under what I term the 'old' and the 'new.'

Name of Consolidated School.	Sections included.	Teachers employed.		Total of Salary per Annum.		Children enrolled.		Average daily Attendance.		CONVEYANCE.	
		Old.	New.	Old.	New.	Old.	New.	Old.	New.	No. of vans.	Average cost per van per School day.
				\$	\$						\$ cts.
Middleton, N.S.....	8	10	11	3,495	5,729	361	409	198	284	11	2 08
Guelph, Ont.	5	6	7	2,200	4,450	174	258	116	171	8	2 60
Kingston, N.B.	7	7	5	1,700	2,950	125	163	55	134	7	2 15
Hillsboro', P.E.I.	6	6	6	1,190	3,300	148	161	89	119	6	1 67
	26	29	29	8,585	16,429	808	991	458	708	32	

The increased cost of the consolidated schools over the single rural schools is caused largely by the better salaries paid to the teachers. The 29 teachers in the section schools received on the average \$296 per annum ; the 29 teachers in the consolidated schools received on the average \$566 per annum. It will not be necessary to pay so much for the teaching staff in the consolidated schools when the Normal schools turn out teachers qualified to conduct school gardens, some household science work and manual training as well as the ordinary book subjects. The cost of conveyance of the children is a large item of expense. At Middleton, N.S., the average cost per van per school day was \$2.36 in 1903-4, \$2.03 in 1904-5 and \$1.84 in 1905-6. When the school boards undertake to meet the whole expense themselves, still more economical methods of management will prevail. The larger children will walk to meet the vans at convenient points, and in some cases parents themselves will arrange for the conveyance of their children.

The educational results from these schools have been entirely satisfactory to the authorities, to the teachers, and especially to the parents and children. The average daily attendance at the consolidated schools was on the whole over 55 per cent higher than the average daily attendance at all of the schools which formerly served the localities ; at Kingston, N.B., it was over 140 per cent higher.

The attractiveness of the consolidated schools becomes in itself a form of compulsory education—the interest of the children being the power which secures regular attendance. A great point has been gained when love of the school and love of the education there set the pace for progress.

One of the gratifying results is the large number of boys and girls, young men and young women, from rural homes, who are doing advanced or high school work. At one of these schools there were about 100 pupils in the high school grades. Many of these are preparing to be teachers in rural schools. When teachers, who themselves have been educated in consolidated rural schools, with nature study, household science and manual training, teach in single rural schools they will make the influence of their own training tell throughout many of the one-room schools.

At Middleton, N.S., after the three-year period was up, in August, 1906, the people themselves undertook to maintain the consolidated school with all the depart-



HOUSEHOLD SCIENCE ROOM, MACDONALD CONSOLIDATED SCHOOL, GUELPH, ONT.

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ments. Some of the routes on which the children were conveyed in vans had been six miles long. The area for the consolidated school was reduced, the more distant sections reopening their small schools. Some of the larger children from them find their own way to the consolidated school. The conveyance of the children in vans was a heavy item of expense. It had been over \$15 per annum per pupil in average attendance. That has been greatly reduced. The cost of conveyance is becoming less at all of the consolidated schools every year. As the ratepayers gain experience and become responsible for the expenditure (with perhaps grants of specific sums from provincial governments) the cost will likely be much further reduced. Sir William Macdonald contributes to the Middleton school \$1,200 per annum for a further period of three years. The consolidated schools provide so much better opportunities for education, that, while the cost is more, it is not apparent that the money they do cost could be spent in any other way with so much direct and lasting benefit to the people. And the people of Canada can well afford to spend as much as they desire to spend on their schools.

Notable results have followed in several of the provinces from these object lessons—Consolidated Rural Schools. Dr. MacKay, Superintendent of Education in the province of Nova Scotia, writes that in his province 53 schools have been consolidated into 22 effective ones. In the province of New Brunswick there are four large consolidated schools, each with nature study and school garden, manual training and household science. The provincial government pays half the cost of conveying the children and gives other special grants.

THE MACDONALD INSTITUTE AT GUELPH.

Sir William Macdonald gave the sum of \$182,500 to provide buildings and equipment at the Ontario Agricultural College, Guelph, to train teachers now in the service for this 'new education.' Besides serving that purpose the Institute has become a headquarters for manual training, for household science and for providing short courses of instruction and 'training for farmers' daughters and others in cooking, sewing, domestic art and other branches of domestic economy. Two buildings were erected. Short courses of instruction in nature study and school gardens were provided without fees to teachers. The governments of four eastern provinces where the consolidated schools were established gave scholarships to enable teachers to attend. Over 200 teachers have already taken these courses. When pupils who pass through consolidated rural schools go on through the Normal schools, each with advanced work and suitable professional courses in manual training, nature study and household science, they will be thoroughly qualified to carry on this better system of education.

As illustrating the benefit which the teachers say they have derived from the three month courses at the Macdonald Institute, I quote from two letters, typical of the expressions and attitude of scores of other teachers. Mr. R. F. Blacklock, Principal of the public school, Smith's Falls, Ontario, has said :

'I feel that I am especially indebted to you and Sir William Macdonald for the opportunity of attending the Macdonald Institute. I think I do not yet fully realise how much good I have received, but I feel that my life has been enriched by coming in contact with those grand young teachers from the other provinces and with Dr. Muldrew and the other teachers. Dr. Muldrew inspired me as no other teacher did before, and I am sure this is true of the other teachers, and though Dr. Muldrew is dead, his spirit still goes marching on in the lives of those with whom he came in contact.

'I consider that the course has been a valuable one, because we were given glimpses of the world around us which we did not notice before, and especially because we were together—a band of enthusiastic Canadians pursuing the same line of work. I think I shall have a different feeling towards other provinces because of having come in contact with those people.

'My work here is very heavy. I have charge of the schools here—twenty assistants—and have to teach a class of 45 pupils, but I feel I am in a position to help my teachers, and through them reach the pupils of this town and interest them more in the great world about us. It will make them better boys and girls—better men and women.

'In conclusion let me again thank you for the part you have played in making this course possible. It is one of the best *federalizing courses* I know of. I am sure each teacher who was there now has a more healthy respect for the other provinces of Canada than he or she had before.'

Mr. Charles McBurney, principal of the Lachute Academy, Lachute, Que., has said :

'I am taking the liberty of sending you under another cover a specimen of the ordinary class work in drawing as taught by Miss B. C. Hall, a graduate of the Macdonald Institute, Guelph. The time given to a lesson is half an hour, and I took this from the work finished.

'We have two of your graduates on our staff here. They were both good teachers before, but now they are wonderfully good. The course at Guelph gave them inspiration and showed them what to teach and how to teach it. The nature study work is most fascinating for the children and they are learning *to see*. I find that all the other work of the course of study is advancing much more rapidly and the knowledge obtained is much more real because of the time given to that work. We shall have two school gardens going in the spring.'

MACDONALD COLLEGE.

Macdonald College has grown out of these attempts and accomplishments, these trials and experiments and evidences of progress, as well as out of Sir William Macdonald's keen desire to help the rural population to build up the country and to make the most of it and themselves. In some measure it grew out of the school garden movement and the consolidated schools, to serve as a headquarters for the training of leaders. In some measure it grew out of the manual training movement, which is a first necessity in the general education of pupils if they are to profit by technical and industrial education afterwards. In some measure it grew out of the oft expressed desire on the part of the educational leaders over the whole Dominion for such advancement and improvement of education for rural communities as would not only prepare the children for life at its best in rural occupations, but would also satisfy the people as being the right training for their children. In consequence it was founded, erected and equipped for the following among other purposes :

1. For the advancement of education; for the carrying on of research work and investigation and the dissemination of knowledge, all with particular regard to the interest and needs of the population in rural districts.

2. To provide suitable and effective training for teachers and especially for those whose work will directly affect the education in schools in rural districts.

The college occupies a beautiful site, over-looking the Ottawa river at Ste. Anne de Bellevue, twenty miles west of Montreal. The main lines of the Grand Trunk and the Canadian Pacific Railways pass through the property, and the stations of both railways are within its boundaries.

The college property comprises 561 acres, and has been arranged into three main areas, viz.: First, the campus with plots for illustration and research in grains, grasses and flowers, containing 74 acres ; second, the small cultures farm of 100 acres for horticulture and poultry keeping ; and third, the live stock and grain farm extending to 387 acres.

THE BUILDINGS ON THE CAMPUS.

(a). The main building provides administration offices, class-rooms and work-rooms for the school for teachers, nature study, household science and manual train-



THE MAIN BUILDING OF MACDONALD COLLEGE.

APPENDIX No. 4

ing, library and reading-room, museum and assembly hall. (b). Two laboratory buildings furnish accommodation and equipment for the departments of physics, chemistry, biology and bacteriology. Both are connected with the main building by covered corridors. (c). The agricultural, horticultural and live stock building contains class-rooms, work-rooms, a live stock arena, farm machinery hall, dairy work-rooms, cold storage and adjacent green-houses for horticulture. (d). The poultry building has class-rooms, judging room, incubator-rooms, brooder-house and pens for different breeds of poultry. Colony houses for poultry are located on adjoining grounds. (e). The women's residence building contains reception rooms and bedrooms for over 200 students, a dining-hall to seat 350, a gymnasium, a swimming pool and all other modern accessories. It is connected with the main building by a covered corridor. (f). The men's residence building has accommodation for over 150 students, a gymnasium, a swimming pool and other modern appointments.

These buildings are of fire-proof construction in stone, brick, steel and concrete. The roofs of the six main buildings are also of steel and reinforced concrete, and all of the roofs are covered with red tiles.

Every building is provided with a complete system of ventilation whereby fresh air (warmed in winter) is furnished to every room, including bedrooms. A duct from each room removes the foul air and thus insures a continuous circulation of pure air.

Every room has a reinforced concrete floor; even if the furniture of one room should get on fire the fire could not spread beyond the room itself. There is nothing in the walls or in the ceilings of the rooms to catch or spread fire. In fact, there is not a wooden joist, a wooden stud, or a wooden rafter in any of the main college building. The buildings are put up in such a way as to cost the lowest possible sum annually for maintenance. One desires to speak of their massive and enduring qualities with the modesty which the founder would appreciate. Nothing has been done for display, but the one and a half million dollars invested in the land, the main buildings and their equipment are a gift for the benefit of the rural population of half a continent, with a particular desire to serve the people of the province of Quebec. Besides donating the whole property without encumbrance, Sir William placed a sum of over \$2,000,000 in the hands of the trustees of McGill University as an endowment for the maintenance of the work of the Macdonald College.

The buildings are heated, lighted and supplied with water from the power-house. A system of tunnels provides for the distribution of heat, light, power, water and gas. The power-house contains six horizontal tubular boilers of 150 horse-power each, with engines, electric generators, pumps and a gas plant. The water supply is taken from the channel of the Ottawa river and will be filtered.

THE SMALL CULTURES FARM.

On the small cultures farm is a commodious brick barn for the storage of garden and orchard produce, the grain grown on the experimental plots, the implements of cultivation, the machinery for threshing and cleaning seed, and for the stabling of horses.

There are several acres of apple orchards in full bearing. The greater part of 100 acres will also be used for commercial work, demonstration and investigation with large fruits, small fruits and vegetables. Macadam and other roads have been laid out and built to give ready access to the various sections.

An area of several acres is set apart for poultry runs, where 1,000 hens will be kept in simple colony houses, each built to accommodate from 25 to 75 fowls.

THE MAIN FARM.

The live stock and grain farm, comprising about 387 acres, is in good state of cultivation and provided with well built roads. The farm buildings consist of a farm

house, a number of cottages, barns with commodious stables for horses and different breeds of cattle and a piggery for different breeds of swine. The cattle stables have room for over 80 milch cows and 100 young animals.

As an instance of the use to which the small cultures farm and the main farm will be put, I may mention that we expect to distribute at low rates specially well-bred and selected live stock in cattle, swine and poultry, particularly to agricultural societies and farmers' clubs, throughout the province of Quebec. We propose to take up from time to time some definite research and illustration work, as, for instance, the improvement of the potato crop, in a manner similar to what we have attempted in the case of improving the poultry for the farmers and the markets. By the spring of 1908 we shall be ready to receive a number of apprentice-students who will assist in carrying on the work on the small cultures farm and on the main farm. When bright young men come to us from the farms of Quebec and other parts of Canada, we shall give them an opportunity of learning the best way of doing things under competent instruction. Diligent, earnest and trustworthy young men can earn enough on the college farms in summer to pay their board while attending the college classrooms during the winter. A student-apprentice in six months may earn his board and a first-class, second-class or third-class credit. A first-class credit will entitle the student-apprentice to free board and room, as well as free tuition in the college during the following six months. During these six months he would be expected to devote probably two hours a day to the continuation of his apprentice work in some of the departments such as horticulture, poultry, live stock or farm machinery. A second-class credit would give him three months free board and tuition; and a third-class credit nothing more than board, room and working instruction during the summer. There will also be some openings for young women as student-apprentices.

DEPARTMENTS OF THE COLLEGE..

Students will be enrolled for courses of instructions in one or more of the three departments or schools of the college, viz.:

1. *The School for Teachers* which provides practical and thorough training for teachers in the art and science of teaching.

2. *The School of Agriculture*, which aims to provide a thorough theoretical and practical training in the several branches of agriculture, and,

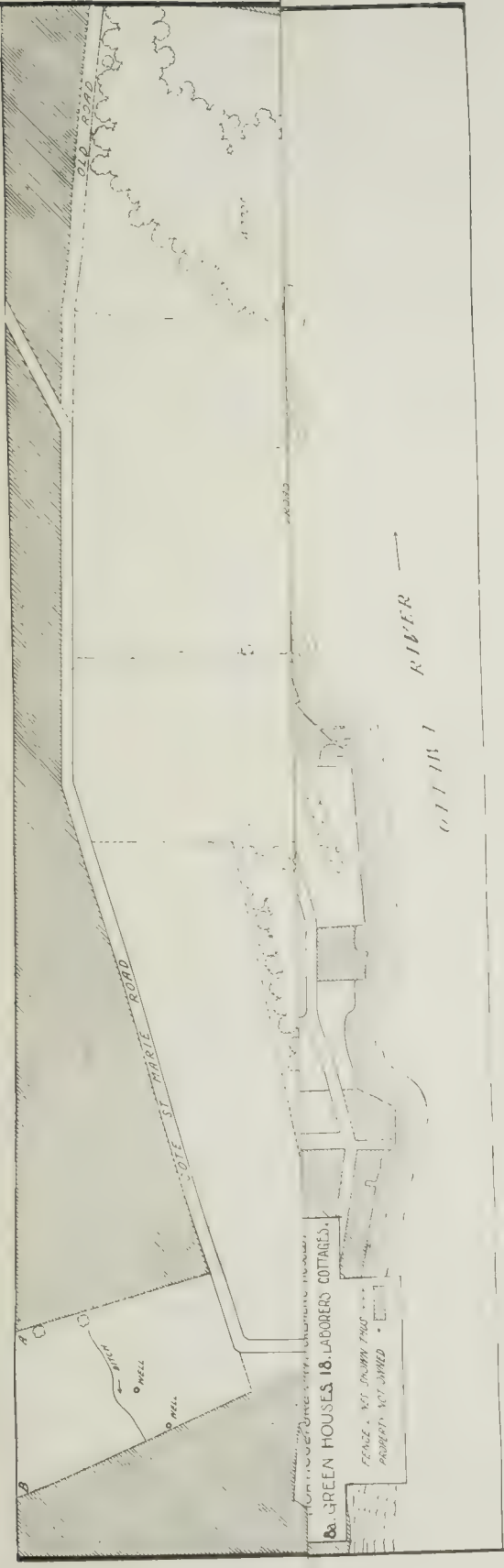
3. *The School of Household Science*, in which young women receive training in those branches of household economy that make for good home-making.

THE GOVERNMENT OF THE COLLEGE.

Macdonald College is incorporated with McGill University. Under the statutes, the Governors of the University constitute the Principal of Macdonald College together with such other members of the staff of Macdonald College and such other persons as the Governors may see fit to appoint from their own number or otherwise, as the Macdonald College Committee. It is the duty of this Committee to direct the educational policy and curriculum, to frame and enforce the necessary regulations touching the details of the course of study and teaching, the college examinations, the admission of students, the amount and mode of payment of fees, and the discipline and internal government.

There is also appointed by the Governors, an Executive Committee of the Macdonald College Committee, whose duties are such as the Governors may from time to time determine, or as the Macdonald College Committee may entrust to it.

All courses given in Macdonald College leading to a degree in the University, the examinations held in connection therewith and fees payable in respect of such courses and examinations, are subject to the approval and under the control of the Corporation of McGill University.



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Courses of study for the training of teachers for the Protestant schools of the province of Quebec, together with the examinations held in connection therewith, are under the direction of 'the Teachers' Training Committee.

The Professors so far appointed are Canadians in full sympathy with the aspirations and ideals of our people and with a knowledge of their needs. We hope for such a mutual bond of sympathy and confidence between the staff, the pupils and the public as will enable the college to render the largest and best possible service to its constituents. In the widest sense its field is the world.

THE SCHOOL FOR TEACHERS

By an agreement with the government of the province of Quebec, confirmed by an act of the Legislature, it was provided that a school for the training of teachers for the schools under the control of the Protestant Committee of the Council of Public Instruction should be established and carried on at Ste. Anne de Bellevue in lieu of the McGill Normal school in Montreal. In this department the college will give a thorough training to teachers by instruction and training in the school for teachers itself, and by practice in the model schools. The arrangements will afford excellent facilities to student teachers from all parts of the province. The session of this school will begin 17th September, 1907, and close on the 17th of June, 1908.

Besides the training of teachers for all the schools under the Protestant Committee in the province of Quebec, the college will receive other teachers for training and will also provide courses for teachers in (a) nature study work with school gardens, (b) household science, and (c) manual training. These teachers may come from any part of Canada and from elsewhere, 'all with particular regard to the interests and needs of the population in rural districts.'

THE SCHOOL OF AGRICULTURE

First terms begins October 1, 1907, and ends December 21, 1907. Second term begins January 3, 1908, and ends April 30, 1908.

Courses are offered in the School of Agriculture as follows :

- A. Short courses of from two weeks to three months each.
- B. A two-year course leading to a diploma.
- C. A four-year course leading to the degree of B.S. in agriculture.

A. Short courses are provided and made as practical as possible in—

- 1. Live stock.
- 2. Seeds, crops and weeds.
- 3. Poultry.
- 4. Horticulture.

B. The two-year course embraces studies in :

- 1. Field and cereal husbandry.
- 2. Animal husbandry.
- 3. Poultry husbandry.
- 5. Horticulture.

Studies duly co-ordinated are carried on in the chemistry, physics, biology and bacteriology laboratories, bringing out the direct bearing of the sciences on agriculture. Adequate attention will also be given to English, mathematics and bookkeeping.

C. The four-year course : This is a continuation of the two-year course for the purpose of affording opportunity for more advanced knowledge of rural economy and more thorough and exact acquaintance with the natural sciences and their applications to the conditions, processes and organizations of rural life.

A student may proceed with the work of the third year towards a degree :

(a) If on entering his first year he presents a matriculation certificate, or an equivalent, and completes a satisfactory examination on the work of the two-year course ; or

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(b) If he obtains 60 per cent in general proficiency in the examinations on the work of the two-year course, and also has the permission of the faculty.

Third year.

English (composition and literature), French, economics, agronomy, live stock, dairying, horticulture, chemistry, physics, biology, bacteriology.

Fourth year.

English, French, physics, chemistry, biology, bacteriology, and one of the following optional courses: Animal husbandry course, agronomy course, horticultural course, dairy husbandry course.

THE SCHOOL OF HOUSEHOLD SCIENCE.

First terms begins September 24, 1907, and ends December 21, 1907. Second term begins January 3, 1908, and ends April 3, 1908. Third terms begins, April 7, 1908, and ends June 26, 1908.

The school of household science occupies along with the school of education all of the second and third floors of the main building. It contains three large kitchens, a practice dining-room, a sewing-room, a class laundry, millinery and dress-making rooms, a house decorating room, a practice apartment house, several store-rooms and offices, all thoroughly equipped for instruction in the science and art of house-keeping.

Courses are offered in domestic subjects, as follows:—

A. Short courses.

B. A one-year homemaker course.

C. A two-year course leading to a diploma.

A. The short courses last three months each, are made as practical as possible, and include the study of:

1. Foods.
2. Plain cooking.
3. Sewing.
4. Laundry.
5. Home nursing, sanitation and hygiene.
6. Home art.
7. Care of the house.

B. The one-year home-maker course embraces practical and theoretical work in:

1. Foods.
2. Cookery.
3. Household economics.
4. Materials for clothing.
5. Dressmaking and millinery.
6. Laundry.
7. Fuels, ventilation and house sanitation.
8. Home nursing and hygiene.
9. Home art.

Simultaneous studies are carried on in the physics, chemistry, biology and bacteriology laboratories to show the direct bearing of the sciences on the practical side of housekeeping.

C. The two-year course is an extension of the one-year course comprising a more intensive study of the subjects therein embraced and also more advanced laboratory work in the chemistry, physics, biology and bacteriology departments. English, mathematics and history are also obligatory subjects in this course, and the student is allowed to choose two of the following: Home dairying, poultry, horticulture, seeds and plant improvement and woodcarving.

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TERMS OF ADMISSION.

All candidates for admission to the Schools of Agriculture and Household Science :

1. Must be seventeen years of age.
2. Must produce satisfactory evidence as to moral character and physical health ; and
3. In case of candidates for the courses in agriculture must produce evidence of having worked for a season on a farm in Canada, affording a practical knowledge of ordinary farm operations.

No entrance examination test will be required for the Short Course students, but all candidates for the one and two-year courses will be required to pass an examination in :

Reading, writing and dictation.

English grammar.

Elements of arithmetic.

Outlines of general geography and the geography of Canada.

TUITION FEES AND LIVING EXPENSES.

Tuition will be free to residents of the Province of Quebec, and, to the extent to which there is room, practically free to other Canadians.

There will be a small laboratory fee (not exceeding \$5) to cover the actual cost of materials used, and a contingency fee to cover possible breakages, penalties, &c.

Students in Residence.—The young women in residence will be in charge of a house-mother. A dietician and housekeeper will supervise the dining-room and the work of the servants. A matron will be in charge of the men's residence.

Board and room will be furnished for \$3.25 per week each, where two students occupy one room, and in case of students occupying single rooms \$3.50 per week.

Further details as to the courses, &c., will be found in the announcement of the Macdonald College, which will be sent on application.

In brief, Macdonald College stands for the advancement of education, for the carrying on of research work and investigation and the dissemination of knowledge all with particular regard to the interests and needs of the population in rural districts. Its motto is *Mastery for Service*.

There are no exclusions because of race or religion. We expect that students who belong to the various races, united in Canadian citizenship, will go there, seeking to develop high moral character, sturdy, intelligent and energetic minds and wholesome capable bodies. The college is primarily for the sons and daughters of Canadian citizens, particularly for those of the province of Quebec, but its doors are open to other young men and women of good moral character, physical health and natural talent, who earnestly seek to qualify themselves for filling their places with benefit to others and with credit and satisfaction to themselves.

Mr. Chairman, I thank you and the members of the Committee for this opportunity of presenting to you something of what has been attempted and accomplished under the Macdonald Movement and of the work that is contemplated at and by the Macdonald College. I thought you would be interested in learning something of those matters, and your reception of what I have said has assured me that I was not mistaken.

HON. MR. FISHER.—The information which Dr. Robertson has given to the Committee to-day in regard to the Macdonald College at Ste. Anne's will, I think, be of the greatest interest to the agricultural community all over Canada. I hope that our people generally will take to heart the words that he has uttered in regard to agricultural instruction and development. They show the true spirit of investigation

and of successful operation. Let me say just one word in regard to this institution at Ste. Anne's. Sir William Macdonald, with large-hearted generosity, and with what I believe to be a true appreciation of the most important needs of Canada, has out of his means placed an opportunity in the hands of the people of this country for enormous good. In doing this and in devoting this large amount of money to agricultural development, and thus appreciating and endeavouring to meet the real needs of this country, he has shown a wisdom as well as a generosity in his gifts. He has shown especial wisdom in choosing Dr. Robertson for the control and management of this institution. Without any desire to flatter, I do not think there is any man in Canada to-day who thoroughly understands the whole agricultural situation and the needs of the country as Dr. Robertson does. His experience as an administrator and public servant has given him unusual opportunities for the study of these things, and his success in the positions he formerly occupied augurs well for his success in this great undertaking. I hope that the members of Parliament, and the members of this Committee especially, will visit the institution in the near future. I have had the opportunity myself of seeing it grow and have felt the most intense interest in all that has been done. I think that Dr. Robertson in characterizing this as the best equipped institution of its kind is not saying one word too much. We have always as Canadians considered that Guelph was the very acme of agricultural colleges, I believe, in the whole world, and we have had the evidence of others who are not Canadians in that sense. With the example of Guelph before him and with the almost unlimited means at his disposal, I believe that Dr. Robertson, with the assistance of Sir William Macdonald, will be able at Ste. Anne's to do even better than at Guelph. I trust our friends will visit Ste. Anne's and observe what is going on there and learn what is intended to be carried on, and that the members of this House and of this Committee will take every means of distributing the information that is contained in Dr. Robertson's address.

THE CHAIRMAN.—I feel sorry that we did not secure an address from Dr. Robertson at a more opportune time this session. Had we met for this purpose earlier in the session we could have given him a much longer time for his address than merely an hour. Unfortunately, we did not think of it. However, we have done the best we could, and I trust that next session we shall afford him a better opportunity of enlightening us on the subject that he has brought to our attention to-day.

On motion of Mr. Sproule, seconded by Mr. Wright (Renfrew), a resolution of thanks to Dr. Robertson for his address was unanimously adopted.

Having examined the preceding transcript of my evidence I find it correct.

JAS. W. ROBERTSON,
Principal Macdonald College, Ste. Anne de Bellevue.

THE EVIDENCE

PART II.

IMMIGRATION AND COLONIZATION

IMMIGRATION.

HOUSE OF COMMONS,

COMMITTEE ROOM 34,

WEDNESDAY, March 13, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 a.m., Mr. McKenzie, Chairman, presiding.

The CHAIRMAN.—The business before the Committee to-day is the examination of Mr. C. H. Beddoe, Accountant of the Department of the Interior. Mr. Beddoe is present.

Mr. C. H. BEDDOE, was sworn and examined, as follows:—

VISIT OF INSPECTION TO EUROPE.

By Mr. Monk :

Q. Mr. Beddoe, you were sent over by the Department of the Interior to Europe to look through the accounts of the North Atlantic Trading Company, were you not ?

A. Yes

Q. Have you the letter of instructions under which you proceeded to Europe on that mission ?

A. I have not it with me. My mission to Europe was the outcome of a letter which was received from the Auditor General in which he refused to pass any further accounts of the North Atlantic Trading Company until such time as he should receive a certificate from a responsible officer of the department that the expenditure called for under section 3 of the contract had been made, and the minister decided to send me to the office of the company in order to investigate and look into the accounts which had been rendered to the department as evidence of the company having fulfilled that part of the contract.

Q. Is that letter from the Auditor General on file in your department ?

A. Yes, sir. I think it is printed in the Auditor General's report for 1905-6.

Q. Will you produce a copy of it ?

A. I think I have a copy here. (After making search.) Yes, here it is. It was written on September 6. Shall I read it to the committee ?

Q. Well, not for me. If you will produce that copy I will be satisfied for my part.

A. Briefly, the Auditor General points out that the larger question, namely, as to whether the North Atlantic Trading Company had fulfilled all the requirements of the contract entitling them to the payment asked for is one for careful consideration. One of the conditions was that the company agreed to expend in carrying out its operations a sum of money not less than \$15,000, this to be accounted for at the end of each year, terminating 30th June, together with satisfactory proof in the form of vouchers, &c., showing that the expenditure had been made. The letter goes on further but that is really the pith of the thing.

Q. Pursuant to this letter to which you have just referred, did you get a letter of instructions from your own department or a memorandum regarding what you were to do on the other side of the Atlantic ?

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A. Nothing further than that I was to try and carry out the wishes of the Auditor General.

Q. Have you the report which you made in consequence of your trip ?

A. Yes, I have a copy with me. (Produces document.)

Mr. C. H. Beddoe's Report to Minister of Interior.

DEPARTMENT OF THE INTERIOR,

OTTAWA, January 7, 1907.

Honourable FRANK OLIVER,
Minister of the Interior,
Ottawa.

SIR,—In accordance with your request I now have the honour to report in regard to my recent mission to London and the Continent. The necessity for visiting these places was in consequence of the action of the Auditor General, who, as you are aware, refused to pass any further accounts of the North Atlantic Trading Company until a responsible officer of the Department of the Interior would give a certificate to the effect that the books, vouchers and accounts of the company had been examined and that the sums specified in section 3 of the contract had been expended during the years 1903-4, 1904-5, 1905-6.

I arrived in London on Saturday afternoon, 24th November, and proceeded to Amsterdam, the head office of the company, on the following Wednesday night. During my stay in London I had an opportunity to examine and arrange thoroughly the accounts which had been furnished by the company during the three years mentioned. This enabled me to find out exactly what would be needed to give the required certificates. On my arrival at Amsterdam I found no difficulty in locating the head office. There I met the manager, the secretary and the assistant, all of whom speak four or five languages. They have each of them done considerable work in establishing agencies and sub-agencies in different countries and their knowledge of languages makes them specially fitted for that class of work. It is also useful to them because of their being able to translate the voluminous correspondence which comes to the head office. In addition to the head office the company rents another large office near the railway station. I visited this office with the secretary and his assistant and found that they had a large quantity of literature of various kinds and made these quarters the shipping point.

The company has a well established system which enables them to follow out their propaganda in a business-like manner. They have agencies at Hamburg, Rotterdam, London, Libau, Odessa, Obo, Christiania, Stockholm, Copenhagen, Gothenburg and Amsterdam. These are the principal agencies, and there are many sub-agencies attached to each. Special agents are doing work in Scandinavia, Germany and other countries—quite a number of clergymen are assisting in the propaganda.

Owing to the stringent laws on the continent in regard to emigration a system has been adopted by the company which minimises danger to the promoters in this respect. The German, Swiss and Luxemburg propaganda is worked through an agency in another country; the Austrian business is managed at a point in Germany, and so on. The names of those who are considered likely to emigrate are furnished by the agents and sub-agents and suitable literature is mailed to the addresses given. The postage on this literature is necessarily heavy on account of its having to be sent by letter-post. Records are kept in regard to the distribution of the literature showing the date, quantity shipped, name of consignee and destination.

I beg to state that the vouchers and receipts relating to the expenditure during the three years mentioned were examined thoroughly. The payments were verified by the book entries and a large number of correspondence files bearing on the expenditure were also examined in further verification of the payments.

There is no doubt in my mind as to the expenditure called for by the contract having been made and I can certify not only to the sum of \$15,000 having been ex-

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pended in each of the years mentioned, but also that the \$1,000 required to be expended annually in Scandinavia has also been spent. After going over the expenditures I came to the conclusion that the company, knowing that the contract was to run for ten years, deliberately set about forming a widespread propaganda with a view to future business. They were evidently aware as business men, that the only way to obtain a large return was to spend money freely in advertising, and the printing and distribution of suitable literature and also by well organized agencies throughout the continent.

The total expenditure during the years mentioned above was as follows :—

1903-4..	\$29,037 89
1904-5....	29,759 18
1905-6.....	25,631 54
	<hr/>
	\$84,428 61
	<hr/>

Under the contract it was necessary for them to expend only \$45,000 on the continent and \$15,000 in Scandinavia, or a total expenditure of \$60,000 during the period mentioned. The figures above show a surplus expenditure during the three years over and above the sum called for in the contract amounting to \$24,428.61. The expenditure connected with the Scandinavian propaganda was as follows :—

1903-4....	\$9,091 60
1904-5....	6,740 36
1905-6....	7,347 75
	<hr/>
	\$23,179 71
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The expenditure in other countries was —

1903-4....	\$19,946 29
1904-5....	23,018 82
1905-6..	18,283 79
	<hr/>
	\$61,248 90
	<hr/>

The expenditure may be subdivided into three heads—

(1) *Cost of management*, including salaries, rent, postage, travelling expenses, allowance to agents for conducting propaganda, commissions to agents and petty office expenses.

(2) *Printing*—

(3) *Advertising*—

Cost of management.—The salaries paid to the staff at head office are not heavy considering that they devote their whole time to the work. The manager receives about \$1,500, the secretary \$1,400 and the assistant \$750. An allowance is made to the head office in Scandinavia (Gothenburg), amounting to 500 kroners per month to cover salaries and postage—this is equal to about \$125 per month. The principal expenditure for travelling has been incurred by the staff at Amsterdam, who direct the whole propaganda, establishing agencies and sub-agencies throughout the districts covered by the contract. The postage is heavy because the company could not conduct their work openly and the literature, hundreds of thousands of copies of which have been mailed, has been sent by letter-post. An allowance has been made to some of the agents for furthering the propaganda work. The petty office expenses consist of taxes, fuel, light, telegrams, &c.

Printing.—During the three years ending June 30, 1906, the following literature was printed :—

1903-1904.

- 335,000 copies of pamphlet *Canada*, in seventeen different languages.
- 115,000 copies of *Canadakarten* in eight different languages
- 350,000 covers for pamphlets.
- 150,000 copies of German pamphlet *Canada*.
- 150,000 wrappers for German pamphlet.
- 5,000 pamphlets printed in Dutch.
- 100,000 copies Swedish paper *Heddelande*.

1904-1905.

- 300,500 copies of pamphlet *Canada* in sixteen languages.
- 250,000 covers.
- 100,000 *Canadakarten*.
- 35,000 Scandinavian cards.
- 20,000 Swedish pamphlets.
- 5,000 Swedish circulars.
- 5,000 Norwegian circulars.
- 50,000 German pamphlets.
- 50,000 wrappers and application forms.
- 5,000 'Letters from Clergymen.'

1905-1906.

- 275,000 copies of pamphlet *Canada* in thirteen different languages.
- 300,000 covers for pamphlet.
- 173,500 agents' advertisements on back of pamphlets.
- 5,000 large Dutch pamphlets, 20 pages with map.
- 130,500 *Canadakarten*, printed in thirteen languages.
- 15,000 large Swedish pamphlets, 28 pages.
- 10,150 large Norwegian pamphlets, 32 pages.
- 100,000 maps lithographed in three kinds, 75,000 in five colours and 25,000 in six colours.
- 1,000 Hungarian pamphlets, large size.

The cost of the printing, including engravings, blocks, freight and translating, was as follows :—

1903-4.....	\$ 6,516 21
1904-5... ..	3,995 14
1905-6... ..	3,920 96
	<hr/>
	\$14,432 31

Advertising.—In addition to the printing of literature the company adopted a systematic method of advertising, principally through large advertising bureaus. Copies of newspapers containing the advertisements have been furnished to the department. It may be mentioned that no large expenditures were incurred at the agencies, either for printing or advertising, until estimates had been submitted to the management. The company has endeavoured to obtain the best results at as low a cost as possible. Advertisements have been inserted in hundreds of newspapers in Scandinavia and other countries on the continent. The total cost of advertising during the three years amounts to :—

APPENDIX No. 4

1903-4.. .. .	\$ 3,294 68
1904-5.. .. .	7,480 89
1905-6.. .. .	3,696 51
	<hr/>
	\$14,472 08
	<hr/>

In conclusion I would say that from the evidence produced by the management there can be no doubt as to the company having fulfilled its part of the contract in respect to the expenditure of the sums mentioned. There can be no doubt as to the result of their propaganda—Canada has received an increasing number of emigrants each year, although the number from Scandinavia was not what might have been expected from the sums expended.

Respectfully submitted,

(Sgd.) CHAS. H. BEDDOE,
Accountant.

Q. How long were you in Amsterdam ?

A. About one week.

Q. How long were you in London ?

A. I think about the same time.

Q. Did you return from Amsterdam to London ?

A. Yes.

Q. Then if I understand right, you went from London to Amsterdam in pursuance of this letter, and returned to London, and from London returned here ?

A. That is right, yes,

Q. Who assisted you in the examination of the accounts of the North Atlantic Trading Company of London ?

A. In London ? No one except myself.

Q. Was there somebody there who produced the accounts to you ?

A. I took the accounts with me. I had not the opportunity before leaving Ottawa to go into them as thoroughly as I would like to so I stayed for some time in London and arranged them in such a way that it would enable me to check them when I arrived in Amsterdam. That is what I referred to when I said I was examining the accounts in London.

Q. When you came back from Amsterdam, did you remain long in London ?

A. I think for four or five days.

Q. You say you took the accounts from here to London but you had some accounts to audit in London, had you not ?

A. Not to audit. I went over them carefully and arranged them. I mean the accounts which I took with me from here.

Q. What you did in London then was merely, as you state in your report, examine and arrange thoroughly the accounts which had been furnished by the company ?

A. Yes.

Q. During the three years' agreement ?

A. Yes.

Q. You made no examination or audit in London, I mean of any accounts or documents there ?

A. No, none at all.

Q. And these accounts and vouchers which you took over to London are in the department here ?

A. Yes, they are in my office now.

- Q. You have them all together ?

A. Yes.

Q. All that you took over, all the documents that you took over, you have together in your office here ?

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A. Yes. Well, I should not say all, there were some which I left in Amsterdam. They were accounts which had been considered by the Auditor General as not reliable vouchers and I left those in the office of the North Atlantic Trading Company and instead of duplicates which had been furnished I brought back the originals.

Q. Did you make inquiries in London as to where you were to go and whom you were to see in Amsterdam in regard to the North Atlantic Trading Company?

A. No, I was instructed to go to Amsterdam, to the office there.

Q. Then if I understand right during the week you were in London, before proceeding to Amsterdam, you had nothing to do with our agents there, you were merely attending to your own work?

A. With the agents of the——

Q. With the agents of the department?

A. Yes, I spent considerable time with the assistant superintendent of emigration there, Mr. Bruce Walker.

Q. In regard to this audit?

A. No, other matters.

Q. Other matters?

A. Yes.

Q. These accounts which you took over to London to examine there, covered three years if I understand right?

A. Yes, that was all that was asked for by the Auditor General, 1903-4, 1904-5, 1905-6.

Q. And it was in London that you first examined these accounts?

A. I had looked over them in a cursory way in the department but never examined them thoroughly.

Q. Are they very voluminous?

A. They were not very voluminous, no.

Q. Roughly speaking, how many documents would there be in connection with this?

A. I could not say exactly, there must be 400 I suppose.

Q. 400?

A. That is speaking roughly. They furnished samples of literature that had been printed. Of course I am not now including samples of the advertisements. We have boxes of those in the department now; we have all the advertisements that were placed in the newspapers in various countries on the continent.

Q. Did you prepare an audit in London in consequence of your examination of these four or five hundred accounts, an original audit, or what did you do with them in London?

A. That is before I went to Amsterdam?

Q. Yes?

A. I arranged them and made summaries and had the details as full as I could so that I would have them ready for reference. I thought it would be better to do that than to use each voucher.

Q. You prepared a statement?

A. Yes.

Q. Have you that statement?

A. No, I have not.

Q. Have you kept it?

A. No, I would be ashamed to show it to any one, it was done so roughly.

By Mr. Maclean (Lunenburg):

Q. It was only a classification?

A. That is all.

Q. For your own convenience?

A. Just for my own convenience.

APPENDIX No. 4

By Mr. Monk:

Q. There was no statement prepared ?

A. No statement prepared.

Q. No formal statement ?

A. No statement.

Q. Will you produce before the committee this package of documents which you took over to London ?

A. Yes. Does the committee want it this morning ? If so I will telephone for it.

Q. No, sir, it will be sufficient if you will have the documents here at the next meeting. Do you happen to have with you a copy of the contract of the Canadian government with the North Atlantic Trading Company under which the difficulty as to these accounts arose, because there were three different arrangements ?

A. Do you mean the contract under which that section was included which I spoke of just now ?

Q. Yes.

A. I think I have it with me.

Q. I suppose it would be the last contract ?

A. Yes. This is the contract of November 28, 1904. (Produces contract.)

CONTRACT WITH NORTH ATLANTIC TRADING COMPANY.

Agreement bearing date the twenty-eighth day of November A.D. 1904.

Between His Majesty the King, represented herein by the Minister of the Interior of Canada, hereinafter called the minister, which expression includes also the successors in office of the minister, His Majesty as so represented, being hereinafter referred to as the government, of the first part, and the North Atlantic Trading Company, of Amsterdam, Holland, a body corporate and politic, hereinafter called the company, of the second part.

Witnesseth that in order to secure the carrying on of a propaganda in certain European countries to promote emigration to Canada it is agreed by and between the parties hereto in manner following, that is to say :

1. The company shall and will carry on an active educative work in the agricultural districts of the following countries, namely, Holland, Denmark, Russia, Germany, Austria-Hungary, Luxemburg, Norway, Sweden, Finland and Switzerland, and any other countries which in the judgment of the minister it may be desirable to add to the agreement from time to time to promote emigration to Canada and to make known the advantages offered by Canada as a field for settlement.

(a) by advertisements in the public press ;

(b) by pamphlets published by the company in the various languages of the countries referred to ;

(c) by personal canvass of representatives of the company ;

(d) by other methods which may be suggested through experience gained in the prosecution of the work.

2. The company shall submit all such advertisements and publications to a representative of the Department of the Interior of Canada, if so required, and the same if found unsatisfactory shall be changed to meet the requirements of such officer.

3. The company agrees to expend in carrying on its operations a sum of money not less than £3,000 or \$15,000 annually which is to be accounted for at the end of each year ending 30th June by receipted vouchers, sworn statements or other evidence in proof of expenditure made under this agreement.

4. For the services to be rendered by the company the government shall pay to the company, in accordance with the terms of this agreement, a bonus of £1 for each man, woman and child of the agricultural class and for each girl of eighteen years of age or over of the domestic servant class, arriving in Canada from any of the countries above named other than Switzerland, or any countries added to the agreement as

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aforesaid, and for each such person of the German race arriving in Canada from Switzerland.

5. It is agreed in respect of settlers from Galicia, Bukowinia and Poland, excepting Germans, that the bonus under this agreement shall not be paid on any immigrants in excess of 5,000 coming from these three countries in any one year and this provision shall be made applicable to all accounts between the department and the company in respect of past services, which are as yet unsettled.

6. In order to assist and encourage the company in a special effort in Norway, Sweden and Finland during the next three years, and after that in any countries which the minister may name, the government shall make a grant to the company of £750 a year for special work in those countries on condition that the company undertakes to spend a further amount of £1,000 a year for such special work.

7. The government shall make payments to the company in monthly or quarterly payments as reasonably soon as the accounts can be adjusted. Payments, however, need not be made between March 1 and August 1 in each year if it should not be convenient to make them.

8. No bonus is to be paid on any immigrant not mentally and physically fit, or who is a criminal or has a criminal record, and any expense incurred in having such persons cared for or deported is to be charged against the account of the company.

9. The company agrees that the deposit of £1,000 now held by the government of Canada as a guarantee of good faith and security for the due fulfilment of the agreement or arrangement heretofore existing with the company shall be retained for a further period of three years, interest thereon at three per cent per annum to be paid to the company in the meantime.

10. The government shall furnish the company each month with a statement

(a) of the number of persons who have arrived in Canada from the said countries, showing the number from each country ;

(b) of the number of agriculturalists and of girls over eighteen of the domestic servant class among the immigrants from each country ;

(c) of the sum to which the company is entitled in payment for such immigrants under this agreement.

11. It is further agreed that the company shall not in carrying out their contract with the government act in contravention of the laws of any of the countries in which it is operating.

12. This agreement shall continue in force for ten years from the date thereof, subject, however, to the right of the government to cancel it by notice in writing under the hand of the minister if it shall appear to the satisfaction of the minister that the company is failing to carry out its obligations and subject also to the right of either party to terminate the agreement on four years' notice.

In witness whereof the corporate seal of the company has been affixed hereto and this agreement has been signed by the manager and the secretary of the company and has been signed and sealed by the Minister of the Interior of Canada on behalf of the government.

The North Atlantic Trading Co.,

Manager.

Secretary.

Minister of the Interior.

Q. That is the contract ?

A. Section 3 reads, 'The company agrees to expend in carrying on its operations a sum of money not less than £3,000 or \$15,000 annually, which is to be accounted for at the end of each year, ending June 30 by receipted vouchers, sworn statements, or other evidence in proof of expenditure made under this agreement.'

Q. You say in your report 'I arrived in London on Saturday afternoon November 24 and proceeded to Amsterdam, the head office of the company, on the following

APPENDIX No. 4

Wednesday night?' Now, pursuant to the instructions that you had received, what did you do in Amsterdam.

A. I went to the office in Amsterdam.

By Mr. Carvell:

Q. Where?

A. In Amsterdam.

Q. On what street?

A. 92 Damrach.

Q. Did you have any difficulty in finding it?

A. No, sir, it is on the main street in Amsterdam, the principal street there.

By Mr. Maclean (Lunenburg):

Q. Was the door open?

A. Yes.

By Mr. Monk:

Q. Whom did you see there?

A. I saw the secretary of the company, sir.

Q. Who is that?

A. Mr. Cohen.

Q. Did you see any other officials?

A. Yes.

Q. Which?

A. Mr. Gluck, manager, and Mr.———. I can scarcely pronounce the name, but it is something like Pleiffel.

Q. What is he?

A. He is a sort of clerk or assistant there. There were three in the office.

Q. Had you apprised them of your visit beforehand? Did they know what was the object of your visit?

A. I think a letter had been sent to Mr. Cohen, notifying him I was to be there because it might happen that my trip would have been in vain if I had gone there and found him away.

Q. Did you communicate with them from London?

A. I did not.

Q. You had no communication with them at all before going?

A. No communication whatever.

Q. What did you do then, sir? Will you give the committee an idea of how you proceeded?

A. I gave Mr. Cohen a letter of introduction, and that letter stated exactly what I was sent over for—to audit the accounts for the three years which I have mentioned. I told him that I had brought the accounts with me and I wished to examine the books and make myself acquainted in every way with the facts concerning the expenditure in order that I might see that the money had been expended to enable me to give a certificate accordingly. That was practically what I said.

Q. Did you see any other persons connected with the company?

A. None.

Q. Did you see the president?

A. I did not.

Q. Did you make any inquiry as to who the company was?

A. I did not.

Q. Or who were the parties interested?

A. No.

Q. Had you no instructions to make that inquiry?

A. No.

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Q. And you did not take upon yourself to make any inquiry upon that point ?

A. No, I did not.

Q. So that you do not know to-day, beyond having seen these three gentlemen in the office on that Wednesday and following days, who this company is ?

A. Do you mean the names of those who composed the company ?

Q. Yes.

A. I do not.

Q. Do you know if the company is carrying on business still ?

A. It was when I left Amsterdam. I asked, in view of the fact that the contract had been cancelled, whether they had stopped altogether their operations and they said no. And the fact that they were still carrying on that office there showed that to be correct.

Q. Do you know if the company is carrying on business under the charter obtained in Guernsey or under any charter or memorandum of agreement ?

A. I presume it was carrying on its business in connection with the charter that was obtained at Guernsey ?

Q. And you made no inquiry as to who the shareholders were ?

A. No, I did not go over for that purpose. I was sent to audit the accounts and beyond that I did not do anything else.

Q. Did these men expect your visit ?

A. I think a letter had been sent to them to tell them I was coming so they must have expected me.

Q. Had a date been fixed for your visit there ?

A. Not an exact date.

Q. You do not know whether anybody communicated with them from London to tell them that you were coming on that particular date ?

A. I do not know.

Q. You asked nobody to let them know ?

A. No, I did not.

Q. You say in your report 'They have each of them done considerable work in establishing agencies and sub-agencies in different countries, and their knowledge of languages makes them specially fitted for that class of work.' How did you ascertain that ?

A. By personal conversation with them.

Q. By conversation with them ?

A. Yes, and knowing that they were able to conduct their correspondence in different languages.

Q. How did you know that ?

Q. By seeing the correspondence.

Q. Do you speak different languages yourself ?

A. I speak English fairly well—that is the only one—and a little French.

Q. They told you themselves ?

A. Yes.

Q. And in the same way they told you that they had established sub-agencies in different countries, as you say in your report ?

A. Yes.

Q. Who told you that, Mr. Cohen, or Mr. Pleiffel, or the other gentleman ?

A. Mr. Cohen.

Q. It was Mr Cohen who gave you this information ?

A. Yes.

Q. Personally you know nothing about it ?

A. I have never visited these sub-agencies, if that is what you mean, sir.

Q. What is the extent of your knowledge as to the existence of these sub-agencies ? Could you tell us where they are and who are the sub-agents ?

A. I have a list of the sub-agents in Scandinavia.

APPENDIX No. 4

Q. You have that with you ?

A. Yes.

Q. Will you produce it ?

A. Yes. (Produces document.)

List of names of agents in Sweden, Norway, Denmark and Finland who ordered and obtained through us the Canada pamphlets during the period 1903-1906, viz.:-

Allan Line—

Bennett, Chas., Christiania, Norway.
 Berset, T., Aalesund, Norway.
 Borg, Broderne, Helsingborg, Sweden.
 Granlund, C., Kalmar, Sweden.
 Jrgensen, Malmo, Sweden.
 Lundberg, C. A., Goteborg, Sweden.
 Martens, J., Bergen, Norway.
 Rath, J., Kopenhagen, Denmark.
 Solem, Rich., Trondhjem, Norway.
 Wathne, J. L., Stavanger, Norway.
 Winge, G. E., Stockholm, Sweden.
 Ullitz, C. F. C., Kristianssand, S. Norway.

American Line—

Gunderson, C. A., Bergen, Norway.
 Hohnke, G., Christiania, Norway.

Anchor Line—

Anderson, L., Malmo, Sweden.
 Johansen, O. J., Trondhjem, Norway.
 Lie, Fr., Christiania, Norway.
 Lundberg, J. B., Goteborg, Sweden.
 Nilsen, C., Kopenhagen, Denmark.
 Ulstrup, E., Stavanger, Norway.

Canadian Pacific Line—

Appelberg, Johan, Malmo, Sweden.
 Edenholm, C. J., Goteborg, Sweden.
 Litland, A., Borgen, Norway.
 Pettersson, Ernst E., Ostersund, Sweden.
 Raffel, Albert, Christiania, Norway.
 Ruud, Oluf, Trondhjem, Norway.
 Sandagger, S., Brrup, St. Jyll, Denmark.
 Sannes, O. H., Kristianssund N., Norway.
 Sivertsen, Sig., Trondhjem, Norway.
 Stange, Nicolay, Stavanger, Norway.
 Terkelsen, A., Kopenhagen, Denmark.
 Tnnesen, Hs., Christianssand, S. Norway.

Dominion Line—

Andersen, C., Jaegersborg, pr. Juelsminde, Denmark.
 Dreyer, C., Bergen, Norway.
 Gulaker, Ole, Trondhjem, Norway.
 Haabeth, Brderne, Stavanger, Norway.
 Larsson, E. F., Stockholm, Sweden.
 Musaeus, Nils N., Aalesund, Norway.
 Prahl, Joachim, Kopenhagen, Denmark.
 Rasch, Olof, Christiania, Norway.

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Finnish Steamship Company—

Bostrom, Karl, Kotka, Finland.
 Finska Angbats Akt., Bol.'s Emigrantkontor, Hango, Finland.
 Finska Angbats Akt., Bol.'s Emigrantkontor, Helsingfors, Finland.
 Finska Angbats Akt., Bol.'s Emigrantkontor, Kuopio, Finland.
 Friborg, Karl, Jakobstad, Finland.
 Grundstrom, Fr. & Co., Raumo, Finland.
 Halonen, H. H. H., Kemi, Finland.
 Hallongren, H. J., Ostermyre, Finland.
 Hansen, P. K., Mariehamn, Finland.
 Holstius, J. H., Nykarleby, Finland.
 Lundberg, K., Viborg, Finland.
 Sjoblom, Hugo, Kristinestad, Finland.
 Sjablom, Hugo, Vasa, Finland.
 Sjoblom, Ivar, Bjorneborg, Finland.
 Sjoblom, Ivar, Tammerfors, Finland.
 Stromberg, A., Gamlakarleby, Finland.
 Wikestrom, Joh. Gust., Lovisa, Finland.
 Wikestrom, Joh. Gust., Abo, Finland.
 Winckelmann, E., Uleaborg, Finland.

Skandinavién-America Line—

Myrset, A., Trondhjem, Norway.
 Miller, C. W., Kopenhagen, Denmark.
 Reis, A. E., Goteborg, Sweden.
 Skand.—Am. Kontor, Malmo, Sweden.
 Skand.-Am. Konto, Stockholm, Sweden.

White Star Line—

Hansen, T. Ch., Christiania, Norway.
 Hallstrom, C. W., Goteborg, Sweden.
 Nilsen, Caspar, Bergen, Norway.

Q. This last exhibit, No. 3, which is produced by you as containing the names of the sub-agents of this company, was given you by whom?

A. By the officers of the company.

Q. Mr. Cohen?

A. Yes.

Q. It purports upon its face to be a list of the names of the different large steamship companies doing business on the Atlantic?

A. Yes.

Q. Is that what it is?

A. That is right.

Q. And these agents of the Allan Line, the American Line, the Anchor Line, the Canadian Pacific Line, the Dominion Line, the Finnish Steamship Company, the Scandinavian-American Line, and the White Star Line are the agents whose names were given you by Mr. Cohen as being the agents of this North Atlantic Company?

A. Yes.

Q. Am I right in inferring from this list and from what you have just stated that they make the agents of these different steamship companies their agents?

A. They work in the interests of the North Atlantic Trading Company, I understand.

Q. What is the extent of their interest?

A. Do you mean in regard to bonus?

Q. Yes.

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A. I understand that the company give their sub-agents 20 per cent of the bonus allowed by the government ?

Q. 20 per cent of the bonus allowed by the government is their remuneration to their sub-agents ?

A. That is what I understand, yes.

Q. You understand that from what he told you ?

A. And from the payments which they have made to some of their agents.

Q. Payments ?

A. Yes.

Q. Therefore when you say in your report that they had established sub-agencies in the different countries, you mean that from what information you have, they have arranged with the steamship agents to give them 20 per cent of the bonus to act in the interest of the North Atlantic Trading Company in the booking and despatch of passengers ?

A. I think that was the arrangement.

Q. Have they a written agreement with the steamship agents who are at the same time their own agents, or how did they make that arrangement as to the 20 per cent ?

A. I could not say.

Q. Do you personally know any one of these gentlemen mentioned in this list, exhibit No. 3 ?

A. No, I do not.

Q. You say in your report at page 2: 'The company has a well-established system which enables them to follow out their propaganda in a business-like manner. They have agencies at Hamburg, Rotterdam, London, Libau, Odessa, Obo, Christiania, Stockholm, Copenhagen, Gothenburg and Amsterdam. These are the principal agencies, and there are many sub-agencies attached to each.' What knowledge of that did you acquire in your visit to Amsterdam ?

A. In conversation with the manager and secretary of the company.

Q. Who are these gentlemen in these different cities that I have just enumerated ?

A. I do not know whether I am at liberty to disclose their names.

Q. Do you know their names ?

A. I do, sir.

Q. What makes you say that you do not know whether you are at liberty to disclose their names ?

A. Because I suppose the committee is aware that the laws in those countries are so stringent that in conducting their emigration propaganda they are obliged to keep the agents names secret; it would not do to state that they were openly conducting an emigration propaganda to Canada. Some of these gentlemen are the largest steamship agents in Europe and are acting as agents for the North Atlantic Trading Company.

Q. The position then, as I understand you, is this: you got from Mr. Cohen, or from officials of the company, the names of these gentlemen just referred to at page 2 in your report, you know them and you question whether you can give us those names on account of the stringency of the laws. Is that the position you take ?

A. That is really the position of the matter. I know who they are and I would not like to disclose their names. I have seen the correspondence conducted between the office at Amsterdam and these firms.

Q. Are you aware that there is a clause in the contract which specially provides that in this propaganda they are not to violate the laws of any of the countries where they are operating ?

A. Yes.

Q. Then why do you object to giving the committee those names since it was specially provided that they are not to violate the laws however stringent they may be ? Do you say that they violate those laws ?

A. To be conducting an emigration propaganda in some of these countries leaves them open to severe punishment. I think there is no option of a fine—there is a very

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heavy fine and imprisonment and therefore I have to protect them. I should not divulge their names.

Q. Are they themselves interested in this North Atlantic Trading Company as shareholders?

A. That I could not say.

Q. You never made any inquiry or were given any information as to who in reality the North Atlantic Trading Company is?

A. No, sir.

Q. Were you furnished with a list of these gentlemen at Hamburg, Rotterdam, London, Libau, Odessa, Obo, Christiania, Stockholm, Copenhagen, Gothenburg and Amsterdam?

A. I know pretty well who they are, all of them, sir.

Mr. MONK.—Mr. Chairman, it seems to me that we are up against a difficulty of a somewhat similar nature to that which we encountered last year. The position, as I understand it, is that we have sent over an accountant to look fully into the accounts of the North Atlantic Trading Company, specially commissioned for that purpose. We have here now that public servant, the accountant who has made that inquiry. He is questioned as to his report. He mentions the places where we have—practically it is ours—where Canada has sub-agents conducting a propaganda in certain countries on the continent of Europe. As a result of his trip to Europe and to Amsterdam he knows the names of these gentlemen but he refuses to divulge them to the committee. It seems to me this is a matter upon which we are entitled to full knowledge. I can understand the objection of the witness. The names were probably given to him under the promise that he would not divulge them, unless compelled to do so, and I think the witness should be ordered to answer the question.

Argument followed and Mr. Monk asked for the chairman's ruling.

The WITNESS.—Mr. Chairman, may I be allowed to speak?

The CHAIRMAN.—I think so.

Mr. MONK.—Not before you, Mr. Chairman, have decided the point.

The CHAIRMAN.—Looking at the whole case as it has been presented to me I cannot see that it would be in the interest, or to the credit of this country, that this witness should be compelled to divulge the names of these gentlemen that are operating in Europe. That is my decision.

Mr. MONK.—I have the greatest respect for your ruling but I have another recourse. I am inclined to exercise what recourse I have at my disposal and I respectfully appeal from your decision.

The CHAIRMAN.—Shall the decision of the chair be sustained?

On a division the chairman's ruling was sustained by a vote of 18 yeas to 10 nays.

By Mr. Monk :

Q. I continue quoting from your report at page 2. Referring to the agencies I have just mentioned you say: 'These are the principal agencies, and there are many sub-agencies attached to each.' Do you know these sub-agents as well as the main agents?

A. I stated that simply from the result of a conversation with Mr. Cohen and after, as I say, examining the correspondence. I assured myself that they had sub-agencies at each of the large towns.

Q. Then you remember all these sub-agents?

A. No, I do not.

Q. But if you saw the correspondence?

A. Yes, but I took no note of it at the time.

Q. You took no note?

A. No, sir.

Q. I find these words in your report: 'Special agents are doing work in Scandinavia, Germany and other countries—quite a number of clergymen are assisting in the propaganda.' Who are these special agents referred to in this report?

APPENDIX No. 4

A. Those names are to be kept secret as well. I know the names of some of the clergymen who are working in Germany.

Q. Does that simply apply to the clergymen ?

A. There are a great many letters that have been published—I forget now whether the signature of the clergymen was attached to the letter—bearing testimony to Canada as a field for emigration.

Q. Do I understand that you promised Mr. Cohen that you would not divulge the names of these special agents and of these clergymen ?

A. Yes, I did.

Q. You made him that promise ?

A. I did, sir.

Q. Did you feel that you had authority to make such a promise as that ?

A. Yes. I had to consider the nature of the contract and that they had to conduct their propaganda in secrecy.

Q. Had you instructions to that effect from the department ?

A. No, but from my own ideas in connection with the matter I thought that was the proper way to treat it.

Q. You did not think the matter sufficiently important before making that promise, under the special circumstances, to communicate with the department for instructions ?

By Mr. Crawford :

Q. Do you think you would have secured the information you got if you had not made the promise ?

A. Mr. Chairman and Gentlemen, I do not see that any of this information has anything to do whatever with the mission on which I was sent to Amsterdam. As I said before I was asked to audit the accounts which had been presented to the department to show that the North Atlantic Trading Company had carried out their part of the contract in respect to certain expenditures. I did that as faithfully as I possibly could. Beyond that I would respectfully state that I think the committee should not question me any further in regard to those accounts.

By Mr. Monk :

Q. That is your voluntary statement, is it ?

A. It is my voluntary statement, yes.

Q. But does it not occur to you, Mr. Beddoe, that if these accounts involve payments made to these gentlemen and to these special agents and to these clergymen, this committee is entitled to know who these parties were to whom the payments were to be made ?

Argument followed.

The WITNESS.—Excuse me, the names will appear in the accounts which you have asked to be produced.

By Mr. Monk :

Q. These names will appear ?

A. The names of those to whom payments have been made—every payment. The vouchers will be produced. You have ordered that they be produced.

By Mr. Wilson (Lennox and Addington):

Q. The original vouchers ?

A. The original vouchers, yes.

By Mr. Monk :

Q. Then, Mr. Beddoe, I understand you are going to produce documents that will give us all these names ?

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A. The names of those to whom payments have been made. That is what I understand you are speaking about.

Q. I am speaking of the agents, special agents, clergymen and others benefited by this contract ?

A. That is a different matter altogether.

Further argument followed.

The WITNESS.—What names am I asked for Mr. Monk ?

Q. The names that I asked you for are the names of the special agents in Hamburg and the other cities enumerated in your report and of a number of clergymen who are assisting in the propaganda.

Mr. ROSS (Yale-Cariboo).—Is it fair to ask that information which parliament has already decided should not be given out ?

Mr. MONK.—The names of the parties who compose the company, not these names, was what parliament decided should not be given out.

Argument followed.

By Mr. Carvell:

Q. Did you intend to give the impression to this committee that you learned while in Amsterdam the names, we will say of general agents to whom money was paid in Rotterdam ?

A. Yes.

Q. You learned that ?

A. Yes.

Q. Would you have that same information in Ottawa.

A. Yes, in the accounts.

Q. Then you learned nothing in Amsterdam, so far as the payment of money is concerned, that you will not find in the accounts at Ottawa ?

A. No.

Q. And as I understand it, you are willing to produce all the accounts you have in Ottawa ?

A. Certainly, the committee has ordered them.

Q. Now did you learn the names of any general agents in any of these cities mentioned by my learned friend to whom money was paid other than the names you already have in the department ?

A. Yes.

Q. You did learn the names of some of them ?

A. Yes.

Q. In London ?

A. They were clergymen principally.

Q. Would they be general agents of the company ?

A. Well, travelling agents.

Q. And you learned that in Amsterdam ?

A. Yes.

Q. Has the department paid any money to these people ?

A. Only through the agents of the North Atlantic Trading Company ?

Q. Directly, I mean ?

A. No.

Q. The parliament of Canada has not paid any money to these clergymen ?

A. No.

Q. These clergymen whose names you refuse to divulge ?

A. Yes.

Q. That is some additional information which you received in Amsterdam which you did not have in Ottawa ?

A. That is right.

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Q. And you received this information from the company under the pledge of secrecy ?

A. Yes.

Q. And therefore you refuse to divulge the names, is that it ?

A. I saw in some accounts, amount paid to Rev. J. B. 'Well,' I said, 'I think I should go further than that. I should know who this man is.' They showed me the correspondence and the book entries and everything connected with it and showed me the name, but it was in strict secrecy. If it was known in Germany that these clergymen were travelling around in the interest of emigration to Canada, why they would be probably injured notwithstanding their cloth.

Q. And it is on account of receiving this information under the pledge of secrecy that you now refuse to divulge their names ?

A. Yes.

Q. And you got this information in making your audit ?

A. I did, yes.

By Mr. Hughes (Victoria and Haliburton):

Q. Was there much money paid to these men ?

A. Not very much. There was one clergyman getting £7 10s. a month, I think it was.

Q. For how long ?

A. Well, they were working for some years. It would be \$400 a year altogether.

By Mr. Wilson (Lennox and Addington):

Q. And his expenses ?

A. No, sir,

Q. Has he to pay his own expenses ?

A. He has to pay his own expenses out of that.

By Mr. Ross (Yale-Cariboo):

Q. Would that be bonus or salary ? Was the North Atlantic Trading Company paying their agents on the same principle as the Dominion were paying the company, that is, a bonus, or was it a regular salary ?

A. This was for working up the emigration business.

Q. He did not get so much per head ?

A. No, it was just an advance for propaganda work.

By Mr. Miller :

Q. Were those ministers principally in Germany ?

A. Yes.

Q. In Germany there is a state supported, a state church ?

A. Yes.

Q. And these ministers belong to the state church ?

A. I could not say that, I do not recollect that. Anyway they were clergymen.

By Mr. Monk :

Q. They were clergymen of what denomination ?

A. I could not say that, Mr. Monk.

Q. Do I understand, Mr. Beddoe, from the answer you have just given Mr. Carvell that the names of the company's agent at Hamburg, Rotterdam and the other cities mentioned in your report which you have just refused to give the committee are nevertheless to be found in the audit you made ?

A. There seems to have been some misunderstanding. I thought you wished me to divulge the names of these regular agents of the company.

Q. The agents mentioned in your report at page 2 where you say the company

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has agencies at Hamburg, Rotterdam and eight or ten other cities. I asked you for the names and you told me that you could not divulge them. Is it a fact that they are among the documents which you have and are going to produce ?

A. It will be shown in the accounts to be produced that these people have been working for the North Atlantic Trading Company.

Q. Are those names there too ?

A. Yes.

Q. There is therefore no reason for your refusing to give them, you will give them to us at the next meeting ?

A. They can be found in the accounts.

By Mr. Hughes (Victoria and Haliburton):

Q. I understand Mr. Beddoe has not pledged himself not to give the names of the ordinary agents of the company at Amsterdam but to keep the names of the clergymen secret ?

A. Yes, that is it. No, excuse me, the names of the clergymen will not be divulged in the accounts produced.

By Mr. Monk :

Q. Will the other names be divulged ?

A. Yes, sir.

Q. Therefore when you produce the accounts we will know the names of the agents of the North Atlantic Trading Company at Hamburg, Rotterdam, and the other cities mentioned ?

A. Yes.

Q. We will know those names, you will point them out to us ?

A. They will be there.

Q. You will show them to us at the next meeting ?

A. They will be in the accounts, yes.

Q. And will we find also in the accounts you are going to produce the names of the special agents attached to each ?

A. No, those will not be there.

Q. And are you able to give us the names of these special agents ?

A. I am not.

Q. You are not willing to do so ? You are not able to do so ?

A. Not the names of the special agents.

By Mr. Hughes (Victoria and Haliburton):

Q. Did you visit any other place ?

A. I only went to Amsterdam.

Q. You saw one man ?

A. I saw three there connected with the company.

Q. And a lot of letters ?

A. There was a great deal of correspondence.

Q. More than three men would write or frame ?

A. It is correspondence received, on file.

By Mr. Ross (Yale-Cariboo):

Q. You have stated that as far as those agents are concerned you cannot divulge the names to this committee. You have also stated, as I understand it, that you are going to produce the accounts on the order of the committee. If members of the committee find out the names in the accounts, that is not your fault. You are in honour bound not to divulge the names. Is that what we are to understand ?

A. That is the way it stands.

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By Mr. Hughes (Victoria and Haliburton):

Q. What names are you in honour bound not to divulge ?

A. The regular agents of the company.

By Mr. Monk :

Q. And yet you are going to produce the documents that will contain the names ?

A. Yes.

By Mr. Hughes (Victoria and Haliburton):

Q. Had you authority from the government or the minister when he sent you to go over to Amsterdam and make any secret compact with any such outfit as the North Atlantic Trading Company ?

A. No.

Q. Then why did you make any secret arrangements ?

A. Well, simply because I read the evidence before the committee last year and the debates in parliament.

Q. What authority had you to enter into a secret compact—you are a servant of the Dominion government—what authority had you to go over and make a secret deal with this crew in Amsterdam ?

Mr. CARVELL.—I think that is a severe question.

Q. Why did you enter into a secret arrangement with this——

A. I could not have got any information out of them——

Q. Why did you not come home and report ?

A. All the information that was given to me there was given in the strictest secrecy. That was an understood thing before I went into the books and everything.

By Mr. Monk :

Q. Understood with whom ?

A. With Mr. Cohen, the secretary.

Q. That everything would be strictly secret ?

A. Yes, that was what he said.

By Mr. Wilson (Lennox and Addington):

Q. Could you give us the accounts so that we would have them before the next meeting ? I mean to-day, for instance, send them up to be in charge of the committee so that any member that chooses to look at them could have the opportunity ?

A. Yes.

Q. You will do that will you ?

A. Certainly. I wished to send them up this morning.

By Mr. Monk :

Q. You have other documents bearing on this inquiry ?

A. Nothing for the committee.

Q. Did you examine into the standing of these people, you were sent to investigate ?

A. No, sir.

Q. You made no inquiries as to what their business might be ?

A. I knew from the parliamentary discussion last session.

Q. Are they still managing the North Atlantic Trading Company in Amsterdam ?

A. The same people, yes.

By Mr. Ross (Yale-Cariboo):

Q. From what you saw of the agents of the North Atlantic Trading Company were they businessmen of good standing in different countries ?

A. Were they of good standing ?

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Q. Were they businessmen of good standing ? the agents of the North Atlantic Trading Company ?

A. Yes, first-class, the very best.

By Mr. Hughes (Victoria and Haliburton):

Q. Did you see them ?

A. No, I did not. But take Gothenburg, for instance, they have an immense building and are carrying on a large business there.

Q. How do you know this ?

A. I have seen a photograph of the building.

Q. Did you see a photograph of the men ?

A. No, I did not.

By Mr. Ross (Yale-Cariboo):

Q. You assume from the correspondence that you saw that the booking agents of the North Atlantic Trading Company were businessmen of good standing in their respective communities ?

A. Yes.

By Mr. Monk:

Q. How do you know that ? It is not because you have seen a photograph of a big building that you can surely establish a standing of anybody. We are all in big buildings here. Would the building you saw be solely for the North Atlantic Trading Company's work ?

A. One building is on the Spruits Straat. It is larger than the one at Damrach street and in that they keep all their samples of literature for distribution.

By Mr. Monk:

Q. How do you know that ?

A. I have been there.

Q. How do you know it belongs to them ?

A. That the office belongs to them ?

Q. Yes ?

A. The receipts for the rent were shown in the accounts produced.

By Mr. Hughes (Victoria and Haliburton):

Q. Is it occupied for any other purposes ?

A. For no other purpose. There are maps of Canada on the walls and racks with different kinds of literature, and they have their shipments of books from there.

Q. Did these people know you were going to visit them ?

A. Yes.

By Mr. Wilson (Lennox and Addington):

Q. As to your knowledge of these agents and their standing in the various places mentioned, so far as you have said, you only knew it by hearsay ?

A. That is all.

Q. Only hearsay, that is not very good evidence, is it ?

A. It is satisfactory to me.

By Mr. Hughes (Victoria and Haliburton):

Q. Were these agents in Gothenburg and the other cities mentioned sending emigrants to any other country than Canada ? Had you any knowledge on the subject ?

A. I have no knowledge on the subject.

Q. Do you know whether they sent emigrants to South America or Australia ?

A. I do not know, but it is a generally understood thing that they can control the

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whole emigration from the continent of Europe. Just by one little move of the switch-board they can send it to the South American Republics or to the United States.

By Mr. Monk :

Q. Who can do that ?

A. These large shipping agents on the continent.

By Mr. Hughes (Victoria and Haliburton):

Q. Do you know how many emigrants were sent to the United States last year, for instance ?

A. I have not the figures here.

Q. How many hundred times more to the United States than to Canada ?

A. You mean the shipping agents ? I do not know.

By Mr. Miller :

Q. What position do you occupy in the Department of the Interior ?

A. Accountant.

Q. How long have you been in the department ?

A. Twenty-five years.

Q. When were you appointed ?

A. In 1883.

Q. Col. Hughes under the old Tory government, is that correct ?

A. Yes, that is right.

By Mr. Monk :

Q. Mr. Beddoe, I find in your report that you say: 'Owing to the stringent laws on the continent in regard to emigration a system has been adopted by the company which minimizes danger to the promoters in this respect,'

A. Yes.

Q. What is that system ?

A. For instance, the German emigration is not conducted in Germany. It is done altogether from London, England.

Q. The sending out of literature ?

A. The sending out of literature.

Q. That is done from London ?

A. That is done from London.

Q. How do you know that ? Have you had occasion to find it out ?

A. I know it is the fact.

Q. All literature, as a matter of fact, is issued from London, is it not ?

A. Not all the literature, no.

Q. The North Atlantic Trading Company's literature ?

A. Do you mean printed in London ?

Q. Yes.

A. No.

Q. Is it issued from London ?

A. Do you mean distributed or issued or printed ?

Q. Printed.

A. Most of it is printed in Hamburg, but a great deal of it is printed in London. I went to see a firm to verify the printing of this literature. I thought perhaps the question might be asked later on: 'How did you find out that this immense quantity of literature was printed,' so I took it upon myself to go to the firm who printed it. On the literature itself the name of the printer does not appear. Of course everything is kept secret. It would not do to be distributing this literature in Germany.

Q. So it is printed in London ? Who prints it ?

A. I went to the firm that prints it and told them exactly what I wanted—that I

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wanted to verify the printing of this literature. I had samples with me and I said : 'Did you print that' ? The manager said : 'Yes, we will show you the books if you like.'

Q. Whose firm is that ?

A. Hickson, Ward & Co.

By Mr. Carvell :

Q. And did you verify these accounts by the books ?

A. No, I did not, but I saw the manager. I had the accounts with me and I went over those with him. He said : 'You can see the books if you like.' I said : 'It is not necessary.' It is a very large printing establishment, and I thought it would be an insult to doubt him, so I took his word frankly.

By Mr. Ross (Yale-Cariboo):

Q. Printers keep copies of their orders. You did not check those orders up with the accounts you had ?

A. No.

By Mr. Miller :

Q. You say that in London you took the opportunity of arranging all the accounts?

A. Yes.

Q. Of the North Atlantic Trading Company and getting them systematically arranged ?

A. Yes.

Q. You had those accounts so arranged and went to Amsterdam ?

A. Yes.

Q. You told us you had no difficulty in finding the head office in Amsterdam of the North Atlantic Trading Company ?

A. There was no difficulty.

Q. That their principal office is one flat of a good and well located building on the main street in the city ?

A. Yes.

By Mr. Hughes (Victoria and Haliburton):

Q. The main street?

A. The main street.

By Mr. Wilson (Lennox and Addington):

Q. Two rooms cover a whole flat and if they did what size are the rooms ?

A. I forget whether there was any other office at the back of that.

Q. You can give us a description of the size of the rooms I presume ? We want to get a description of the flat ?

A. They would be 16 feet square.

Q. Each of them ?

A. No, one is a little smaller than the other.

By Mr. Monk :

Q. What rent do they pay ?

A. 400 gulden.

By Mr. Ross (Yale-Cariboo):

Q. What is a gulden ?

A. About 40 cents.

Q. \$160 a year ?

A. Yes, I think that is about the rent they are charged in Amsterdam.

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By Mr. Miller :

Q. You found there three officers, each of whom could speak four or five different languages ?

A. Yes.

Q. To Mr. Monk you said you only spoke English. Did you know from any other ground than was submitted to you that they could speak four or five different languages ? Did you see them going through the books and correspondence in a way that would convince you they had an acquaintance with four or five different languages ?

A. All of them ? Mr. Cohen did because in verifying some of these statements I asked to look at the correspondence. I had the accounts before me and he would show me the letter acknowledging the receipt and money that was sent in payment of the account. It might be in Dutch, it might be in German—I would not understand it, but the figures would be there and he would interpret it, and I had sufficient sense to know he would interpret right because the figures fitted in and everything in that way.

Q. You have spoken of the rent of the office as being \$160 a year. I suppose the purchasing value of \$160 is a good deal more than the same amount of money here ?

A. Rents are very cheap in Amsterdam.

Q. You have said they have another large office at the station at Amsterdam larger than the one you have described ?

A. A larger one.

By Mr. Wilson (Lennox and Addington):

Q. How much larger ?

A. Not very much but still a little larger.

By Mr. Monk :

Q. What do they pay for that second office ?

A. It is in the accounts. I forget.

By Mr. Miller :

Q. On page 2 of your report you state that the company have agencies at Hamburg and other places ? In reply to a question by Mr. Monk you said that you have the knowledge that they have these agencies because of the statement of Mr. Cohen ?

A. The statement and the correspondence.

Q. The correspondence would verify his statements ?

A. Yes.

Q. And you thoroughly examined that correspondence ?

A. I will not say thoroughly, but I saw sufficient to convince me.

By Mr. Monk:

Q. I was asking you, Mr. Beddoe, as to the stringent laws. They have adopted a system to evade the laws and I was asking what that system was and you did not answer ?

A. The laws you mean ?

Q. You say in your report that they have adopted a system—the company has adopted a system—which minimizes the danger to the promoter. What is that system ?

A. The system as to conducting a propaganda ?

Q. In one country from another ?

A. From another country ?

Q. I see that in your report you say: 'The German, Swiss and Luxemburg propaganda is worked through an agency in another country'?

A. That is in England.

Q. 'The Austrian business is managed at a point in Germany,' and so on. Who is the gentleman in England who makes reports ?

A. Mr. Leopold.

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Q. Mr. Leopold is the agent of the North Atlantic Trading Company in England?

A. Yes.

Q. To conduct the German, Swiss and Luxemburg propaganda ?

A. Yes.

By Mr. Ross (Yale-Cariboo):

Q. Was or is ?

A. Was. I do not know whether he is now.

By Mr. Monk :

Q. How did you ascertain that, did you meet him ?

A. I went to his office on the Monday after I arrived in London but he had left for Canada that day.

Q. Did you go to his office on this business ?

A. I did.

Q. How was that ? Had you received instructions to go to him ?

A. No.

Q. What made you think Mr. Leopold was the man ?

A. Because I saw by the evidence given last session that he was the agent of the company. Mr. Preston stated that.

Q. The agent of the company in England ?

A. Yes, that was stated in the evidence last session.

Q. Then the German, Swiss and Luxemburg propaganda is in the hands of Mr. Leopold, you say ?

A. Yes.

Q. How did you make sure of that ? Do you know personally ?

A. By an examination of his books and papers and accounts and the printing of literature and the verification for payments of the printing of the literature and for advertising.

Q. Did you make that verification in regard to the printing in Mr. Leopold's office ?

A. I had the accounts before me and I went to the printing office with these accounts and with samples of the literature. There was a German pamphlet. He had 150,000 copies of a German pamphlet printed one year, 50,000 another year, and I think 50,000 the next year.

Q. All at this printing office ?

A. All at this printing office of Hickson, Ward & Co.

Q. All through Leopold ?

A. All through Leopold.

Q. This verification you made at Leopold's office was after you had returned from Amsterdam ?

A. Before.

Q. Before ?

A. I went to Mr. Leopold's office and found he had gone to Canada the very day I reached there.

Q. But I understood from you that when you first came to England you saw nobody and merely put your accounts in order ?

A. Well, I did not see any one, Mr. Leopold had gone.

Q. But you went and made an audit while you were in London at Mr. Leopold's office ?

A. No, I did not.

Q. What did you audit, you say you verified everything ?

A. I did not audit anything in Mr. Leopold's office. Mr. Cohen told me: 'When Leopold goes away all his books and papers are boxed up and sent to my office.'

Q. It was not in London at Mr. Leopold's office that you verified those accounts ?

A. No.

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Q. It was in Amsterdam where you saw the papers that had all been sent boxed up to Mr. Cohen ?

A. Yes, and on my return to London I visited this printing establishment.

Q. Not Leopold's office ?

A. I did not go back there at all.

By Mr. Hughes (Victoria and Haliburton):

Q. Did this one establishment do all the printing ?

A. Yes, and Street & Co. did the advertising in Scandinavia, and all these other countries.

By Mr. Monk :

Q. You say this printing at the London house you have just mentioned was paid for. Who furnished the cash ?

A. The accounts were rendered to Mr. Cohen by Mr. Leopold. He made the payments and then Mr. Leopold paid the printing and advertising firms. It was not in Leopold's name but in the name of the Farmer's Auxiliary Association.

Q. That the accounts were made ?

A. Yes.

Q. Why were they not made in the name of the company since the printing was being done for the North Atlantic Trading Company ? As a matter of fact it was done in the name of the Farmers' Auxiliary Association ?

A. Yes.

Q. That the accounts were rendered to Mr. Leopold ?

A. Yes.

Q. And by him sent to Cohen ?

A. Yes.

Q. And who ultimately paid them.

A. Mr. Cohen would send the remittance to Mr. Leopold and he would make payment of the accounts. The accounts are all receipted and they will be furnished to the committee.

Q. Let me understand you. Was there a cheque issued by Cohen to Leopold for the payment of these accounts ?

A. The North Atlantic Trading Company.

Q. A cheque was issued by the North Atlantic Trading Company ?

A. Yes.

Q. To Leopold ?

A. Yes.

Q. Have you seen any of these cheques ?

A. No, I have not.

Q. You did not procure those cheques ?

A. I did not.

Q. When you were auditing the accounts did you see them or ask for them ?

A. I did not even ask for them.

Q. All that you know is that the printing was done in London, the invoices were made out to Leopold, sent by Leopold to Cohen and payment made by the North Atlantic Trading Company ?

A. That is the way I understand it exactly.

By Mr. Hughes (Victoria and Haliburton):

Q. Did you come across the Arundel Printing Company ?

A. No, that was not within the scope of my inquiry, sir.

Q. Why not ?

A. Because I was sent over to examine and audit the expenditure of \$15,000 called for by the contract.

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By Mr. Monk :

Q. Did you see Leopold at all when you were over there ?

A. No, I did not. He had gone to Canada the day I reached London.

Q. He was the agent of the company and he left for Canada the day you reached London ?

A. Yes.

Q. He did not know——

A. He did not know that I was coming; I heard that since.

Q. You have not seen him since you began these operations at all ?

A. Not since I began them.

Q. You have never seen Leopold at all ? Do you know him ?

A. I have met him.

Q. Where and when ?

A. In Ottawa.

By Mr. Ross (Yale-Cariboo):

Q. After you came back ?

A. After I came back.

Q. You do not think he left London that day because you were coming ?

A. No, sir.

By Mr. Hughes (Victoria and Haliburton):

Q. Did he explain to you why he sent his books and papers over to Amsterdam ?

A. Yes, it was exactly the reason I stated, that when he was absent for any length of time he would always send everything to the head office.

Q. For fear they would be impounded in England ?

A. No, I do not know that.

Q. You spoke of the rent of buildings a little time ago, of their having two buildings there. Did you ask Mr. Cohen to explain—I read it in the evidence last year—that when letters were sent to the company they would be forwarded back to London and replied to from there ?

A. No.

Q. That appeared in the evidence last year ?

A. I do not remember.

By Mr. Monk :

Q. Did it not appear to you as calling for investigation that the printing done in London under the name of the Farmers' Auxiliary Association should be invoiced to Leopold, the accounts sent from Leopold to Cohen and finally paid by the North Atlantic Trading Company ? Did not that invite you, so to speak, to investigate the matter ?

A. I did closely investigate it to see that the money had been paid out properly and found that it had been so.

Q. How did you proceed to make sure that the money came literally and finally from the North Atlantic Trading Company ? There must have been cheques. Do you say you have not seen them ?

A. It does not matter to me where it came from. The money was paid and it was in the interest of the North Atlantic Trading Company.

Q. How do you even know that ? How do you know it came from the North Atlantic Trading Company ?

A. Where the money came from ?

Q. Yes. It seems to me that if you had the papers or vouchers to establish that it would be more satisfactory ?

A. Because in the books I examined, there was an entry charging money as paid out to the Farmers' Auxiliary Association.

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By Mr. Ross (Yale-Cariboo):

Q. How did they pay the money ?

A. By cheque and by cash sometimes.

Q. Did they have their stubs there for their cheques ?

A. I did not examine the cheques at all.

Q. You did not examine the cheque book and you did not see the cheques ?

A. No.

Q. You say the accounts were receipted and paid for ?

A. Yes.

By Mr. Monk :

Q. You have all these accounts, you brought them back ?

A. Every one.

By Mr. Hughes (Victoria and Haliburton):

Q. You spoke of the printing being done by Hickson & Co. What was the amount of their account ?

A. I think it amounted to £160 in one year—about \$1,000—probably more than that.

By Mr. Monk :

Q. At page 5 of your report where there is a question of printing you mentioned hundreds of thousands of pamphlets as having been printed in 1903-4, 1904-5, 1905-6. Were they all printed in the same way in London by that firm ?

A. No.

Q. Are you able to easily distinguish between what was printed in London and what was printed elsewhere ?

A. Yes.

Q. You will be able to do that for us at the next meeting ?

A. Yes.

Q. And show us where all these things were printed ?

A. Yes.

Q. Take, for instance, 335,000 copies of a pamphlet on Canada in 17 different languages. Where was that printed ?

A. What year is that ?

Q. 1903-4, 335,000 copies ?

A. I think if my memory serves me that was printed in Vienna.

Q. In 17 different languages that was printed in Vienna ?

A. Yes.

Q. Do you know the name of the printer ?

A. It was a company called Monats-Kalendar.

Q. You know that anyway ?

A. Yes, there are full details and receipted vouchers, and I might say to the committee in connection with the distribution of this literature that I examined the books which they kept for that purpose, several books. They have kept strict account of all the literature—where it was distributed, the date, the name of the consignee and the quantity.

Q. Well this pamphlet on Canada was distributed from where ?

A. From Amsterdam principally ?

Q. None of it was sent from London ?

A. None. That is not the German pamphlet on Canada, is it, sir ?

Q. It is the first item I see in reference to printing, 335,000 copies of the pamphlet 'Canada,' in 17 different languages ?

A. No, that was not sent from London, none of that.

Q. In reference to what you have just said a very few moments ago. You say in

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your report the Austrian business is managed at a point in Germany. Who is the man in Germany who manages the Austrian business? Do you know that?

A. Yes, I know the name.

Q. Does that name appear in any of the accounts you have with you?

A. Yes.

Q. If it appears in the accounts you have with you and which you are going to produce have you any objection to giving the committee that name now?

A. The committee can see it in the accounts.

Q. You say the committee can see that name in the accounts?

A. Yes.

Q. I understand you to say that you know that name but you are reluctant to state it because you promised secrecy and it is to be found in the accounts which you will produce at the next meeting?

A. Yes.

Q. The name of that agent who from Germany conducts the Austrian business, is that it?

A. The names of all the German agents to whom payments have been made will be shown in the accounts.

By Mr. Miller :

Q. This one included?

A. This one included.

By Mr. Hughes (Victoria and Haliburton):

Q. And no others?

A. No others.

By Mr. Monk:

Q. That is the Austrian agent who operates from Germany?

A. Yes.

Q. And that name we will see at the next meeting of the committee?

A. All the names.

By Mr. Miller :

Q. I would like you to say whether or not from the general appearance of the offices which you saw in Amsterdam—the office on the main street and the other office near the station—whether they had the appearance of being offices in which a live energetic business was being conducted.

A. I could state there was a large safe there.

Q. Just answer the question directly?

A. There was a large safe there, files for correspondence, regular office furniture and a typewriter. There was every evidence that it was a well-equipped office.

Q. There was?

A. Yes.

By Mr. Monk :

Q. Were you there every day for a week?

A. Except Sunday.

By Mr. Wilson (Lennox and Addington):

Q. How many people were operating in the office?

A. Three.

Q. Just three—one typewriter and two clerks?

A. No, there was the manager, secretary and his assistant.

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By Mr. Miller :

Q. You examined the documents and the correspondence in the office.

A. I did.

Q. And you also examined the books and vouchers, a large quantity ?

A. I did.

Q. Now, I want to know whether or not, in all the correspondence, vouchers and books you examined you saw anything that caused you to believe or to give you any suspicion that any person or resident of Canada, any person residing in Great Britain or any person in any way connected with the Canadian House of Commons or government has anything to do with the North Atlantic Trading Company or receives any part or portion of the moneys paid by the Dominion to the North Atlantic Trading Company ?

A. I saw nothing of the kind.

Q. Nothing to lead you to suspect ?

A. Nothing to lead me to suspect that any member of the government or officer of the government had ever received a cent of money as profit from the North Atlantic Trading Company.

By Mr. Hughes (Victoria and Haliburton) :

Q. Did you examine into the distribution of the profits of the North Atlantic Trading Company ?

A. I did not.

By Mr. Monk :

Q. Then how can you make such an answer ? How can you say you saw nothing that led you to believe the profits were distributed in the way indicated by Mr. Miller when you said you saw nothing of the distribution ?

A. I did not say anything about a distribution.

By Mr. Hughes (Victoria and Haliburton) :

Q. Did you make any inquiry as to how this office had been conducted, say six weeks before they received notice of your going over or two days after you left ?

A. No, I did not.

Q. Did you make any inquiries about that ?

A. I did not.

Q. Do you know how long they had these two offices ?

A. The accounts will show.

Q. Accounts are easily written you know. Do you know anything else, have you any further evidence to show these offices were used ? Did you not see it brought out in evidence last year that letters sent to the North Atlantic Trading Company turned up at London ?

A. That may have happened in this way : they do a lot of travelling, the manager, Mr. Gluck, and the secretary and also his assistant ?

Q. Would the typewriter go too ?

A. I do not think they have any typewriter ; I think they do their own type-writing between them. But the accounts will show that they travel in nearly all the countries in Europe.

Q. Have you any record to show how long they have had the office at the docks ?

A. They have not had the office at the docks as long as they have had the other one.

By Mr. Schell (Oxford) :

Q. At any time did you have any suspicion that the accounts were not absolutely correct or not.

A. No, I did not.

MR. MONK.—Do you think the office is open to-day ?

A. You can send a cable and find out ; that is the only way in which it can be told.

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By Mr. Schell (Oxford):

Q. Every account seemed to be absolutely fair and just?

A. Yes, they had all the details.

By Mr. Lake:

Q. Did you understand the language in which the accounts were rendered?

A. I did not understand the language.

By Mr. Hughes (Victoria and Haliburton):

Q. Did you see cheques?

A. No cheques.

Having examined the preceding transcript of my evidence of March 13, 1907, I find it correct.

CHAS. H. BEDDOE,
Accountant of the Department of the Interior.

HOUSE OF COMMONS,
 COMMITTEE ROOM No. 34,
 WEDNESDAY, March 20, 1907.

The Select Standing Committee on Agriculture and Colonization met here this day at 11 a.m., Mr. McKenzie, Chairman, presiding.

The examination of Mr. C. H. Beddoe resumed.

By Mr. Monk:

Q. Mr. Beddoe, I understand your position at the last meeting of the Committee to be as follows:—You were not willing to divulge the names of the agents of the North Atlantic Trading Company in the different cities of Europe but you stated that the papers that you had brought back from the Continent would reveal those names? Is that correct?

A. I think I stated that the accounts I brought back, and which would be produced to the committee, would contain the names of all parties to whom the North Atlantic Company have made payments. I think those were the words I used.

By Mr. Carvell:

Q. By the Department of Interior of Canada?

A. Payments made by the North Atlantic Trading Company.

A. You mean to say the names of all persons to whom the North Atlantic Company paid money as agents, or only the names of persons to whom money was paid directly by the Department of Interior?

A. None of the latter; it only contains the names of those to whom the North Atlantic Trading Company paid amounts.

By Mr. Wilson (Lennox and Addington):

Q. Do the papers not also contain amounts paid by the government to the North Atlantic Trading Company?

A. No.

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Q. You mean the amounts that the North Atlantic Trading Company paid to these people in order to earn the government bonus ?

A. Yes, to carry out that part of the contract which called for an expenditure of \$15,000. That is all I went over to the Continent to audit, and these accounts, which I now produce, are the accounts representing that expenditure.

By Mr. Carvell :

Q. You do not mean to say you have a record of the moneys paid by the North Atlantic Trading Company to different agencies in Europe ?

A. No, I have not.

By Mr. Monk :

Q. I refer once more to page 2 of your report in which you say : 'They have agencies at Hamburg, Rotterdam, London, Libau, Odessa, Obo, Christiania, Stockholm, Copenhagen, Gothenburg and Amsterdam. These are the principal agencies, and there are many sub-agencies attached to each.' I ask you now, with the papers which you have in support of this report, to give us the names of these agents ?

A. I cannot do that. All that I can do, sir, is to produce the accounts which give the names of those to whom payments have been made.

Q. Therefore you are not able to substantiate this assertion in your report by giving the names of the agents referred to ?

A. Did I say that I would give the names of the agents ?

Q. I understood from you that upon reference to your papers the names of these agents would appear ?

A. The names of all those to whom payments have been made of course will appear.

Q. To that extent therefore, you correct your statement ?

A. I would like to correct it to that extent, if the committee will allow me.

Mr. Ross (Yale-Cariboo).—I do not think that is fair to the witness. There is no correction to be made; the witnesses' statement is absolutely accurate.

By Mr. Monk :

Q. Are you in the position therefore, to give the names to-day of these agents and sub-agents, or do you say that they were given to you under such conditions that you cannot reveal them to the Committee.

A. I cannot reveal them to the Committee.

Q. You cannot reveal them to the Committee ?

A. If the committee will allow me I will read a portion of a letter which was received from the company as far back as 1905. It says : 'The business we are controlling ourselves, and through our friends, is of such a dangerous nature, that even a suspicion of our friends—that they might run any risks by giving vouchers, should the same not be treated in the most careful way, would induce them to prefer no more to work for us, rather than endanger themselves.'

This thing was gone through with the manager and the secretary of the Company and they asked me on no account to divulge or give out publicly, the names of those who had been working for them on the continent. Of course the accounts showing the expenditure, and the amounts paid to those who had been working for them are contained in the vouchers, but I hope the committee will relieve me from the responsibility of giving out their names publicly; that is all I ask.

Q. I suppose therefore, you did make that promise not to reveal those names ?

A. I did.

Q. Would the same observation apply to what is stated a little further down in your report, that is to say, 'The German, Swiss and Luxemburg propaganda is worked through an agency in another country : the Austrian business is managed at a point

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in Germany and so on. I mean you ascertained the names of these agents working from one country in the other, and you undertook not to make them known?

A. I did not in the case of the German, Luxemburg, and Switzerland work because that was conducted from London, England, and in the evidence before the Public Accounts Committee last session, I believe Mr. Preston gave out publicly that Mr. Leopold was the North Atlantic Trading Co.'s agent at London.

Q. Well then, you say now that this gentleman who was conducting from another country, the German, Swiss and Luxemburg propaganda was in reality Mr. Louis Leopold in London? Is that what you say?

A. That has been stated before in Public Accounts Committee.

Q. Is that what you say? Do you say that?

A. Yes, I say that.

Q. You obtained that information there?

A. I know that to be a fact.

Q. And as to the Austrian business that was managed at a point in Germany, what do you say?

A. I cannot give the names of those who are working for the company.

PRINTING BY, AND PAYMENTS THEREFOR, BY NORTH ATLANTIC TRADING COMPANY.

Q. Let me refer for a moment to the printing which you spoke of in the last instance, at the previous meeting of this committee. At page 5 of your report you mention the printing that was done in 1903-4. Will you please state to the committee, referring to your report, where that printing was done?

A. Yes. The copies of the pamphlet 'Canada' in 17 different languages, was printed in Vienna.

Q. By whom?

A. A printing firm called Der Monats Kalender. I think I gave that answer in my evidence previously.

Q. Who ordered that printing and paid for it?

A. It was all ordered through the Amsterdam agency of the North Atlantic Trading Company.

Q. Who paid for it?

A. The North Atlantic Trading Company.

Q. This voucher is partly in a foreign language but at the last page I see a voucher for £181 9s. 2d. sterling, receipted, 'London, 24th June, 1904,' by the Farmers' Auxiliary Association. Is that for the amounts contained in the other vouchers?

A. For how much is it?

Q. £18 9s. 2. sterling. Is that for all that is indicated in the German language and in the Austrian language?

A. Yes, it is for the German pamphlet; I have a copy of the pamphlet here.

Q. Is that the pamphlet 'Canada'?

A. 'Canada,' yes.

Q. Then, as I understand, the voucher which you have just filed from this Vienna printing firm was ultimately paid by the Farmers' Auxiliary Association? Is that correct?

A. No, those are all the accounts for the literature. The sterling and the marks are all put together in this bundle.

Q. In the account of 1903-4?

A. Yes. These receipts are for all the literature that was printed in 1903-4.

Q. For that literature which is detailed in your report?

A. Yes.

Q. Let me understand you. This is the Farmers' Auxiliary Association to whom this has been paid?

A. For the German pamphlet. That was paid to Hickson, Ward & Co., London, England, by the Farmers' Auxiliary Association.

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By Mr. Wilson (Lennox and Addington):

Q. What is the total ?

A. £181 9s. 2d. sterling. There is some other printing there.

Q. Is that the total ?

A. Yes. There is a payment for 335,000 pamphlets printed in 17 different languages by *Der Monats Kalendar*. There was besides that 5,000 pamphlets printed in Dutch. That was printed in Antwerp and the receipt is there with the others.

Q. What I would like to get is the total amount that was paid for printing to these people under that head ? Have you given that for a particular year ?

A. It is for 1903-4. There was paid to *Der Monats Kalender* \$4,528.96. That was for printing 335,000 copies of a leaflet called 'Canada,' in 17 different languages, and the printing of 115,000 copies of what they call 'Canadakarten,' and items to cover freight and translation. Then there was paid besides that to Hickson, Ward & Co., of London, England, through the Farmers' Auxiliary Association, \$883.11 for printing 150,000 copies of a German pamphlet called 'Canada,' and also for 150,000 wrappers for mailing these pamphlets.

By Mr. Monk:

Q. There were 100,000 copies of a Swedish pamphlet in that year ?

A. That is a paper called 'Heddelande.' I have a copy of that paper here.

Q. Where was that printed ?

A. That was printed in Gothenburg. Here is a copy (producing paper). It is illustrated with half-tones.

Q. Do you know, as a matter of fact, that these payments for printing were made by the North Atlantic Trading Company ?

A. I verified them not only by the receipts produced but by the book entries and also by correspondence bearing on these subjects. I do not think that I could go further than that; in fact, I think I made as thorough an audit of the accounts that had been presented to the department, as could possibly be done.

Q. Now the printing for 1904-5, will you give us some information about that ?

A. The next year there were 300,500 copies of a pamphlet 'Canada' in, I think, 17 or 18 different languages, and 100,000 'Canadakartens.' There were 20,000 Swedish pamphlets, 5,000 Swedish circulars, 5,000 Norwegian circulars, a lot of show cards for windows, 50,000 German pamphlets called 'Canada,' and 5,000 'Letters from Clergymen.'

Q. Printed where ?

A. Printed in London, England, the 'Letters from Clergymen.'

Q. But the others ?

A. The 20,000 Swedish pamphlets were printed by Amquist & Company, at Gothenburg.

By Mr. Wilson (Lennox and Addington):

Q. Are the letters signed by the clergymen who wrote them ?

A. No, sir. The 300,500 pamphlets of 'Canada' in foreign languages were printed in Hamburg.

Q. You have the vouchers for those ?

A. Yes.

Q. Will you produce all the vouchers ?

A. Yes. (Vouchers produced.)

MR. MONK.—I think, Mr. Chairman, if the witness will, after the meeting of the committee, classify these vouchers and produce them, it will hasten his examination.

THE WITNESS.—It is a very difficult thing to do, no matter how well they are classified—it will take time to find them—but they are all here; I know that. This

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is the receipt from Hickson, Ward & Co. for the printing of the 50,000 German pamphlets. (Produces voucher.)

By Mr. Monk :

Q. Could you just state where the literature for 1904-5, referred to in your report at page 6, was printed ? Take the list of pamphlets on 'Canada,' in 16 languages, where were they printed ? I think you said in Gothenburg ?

A. No, Hamburg.

Q. The 250,000 covers ?

A. In Hamburg.

Q. The 100,000 'Canadakarten' ?

A. That was in Hamburg too.

Q. The 35,000 Scandinavian cards ?

A. That would be through Amquist & Co. This is the name of the printer and receipt. (Produces receipt.)

Q. Did you see the cheque ?

A. No. I did not.

Q. Did you see any of the cheques or drafts by which these accounts were paid to which you are now referring ?

A. No, I did not; I did not go beyond the books and correspondence. There was a large file in connection with the order for this printing; I remember distinctly a lot of correspondence referring to the printing.

Q. Let us take this voucher marked 'Literature for 1904-5. 50,000 German pamphlets, 'Canada,' 50,000 wrappers and application forms, 5,000 'Letters from Clergymen,' £113 19s. 6d. sterling' ?

A. Yes.

Q. Who made out that account ? There is no heading for it ?

A. I presume it was made out in the London office, Hickson, Ward & Company's voucher is attached to it with full details.

Q. But the voucher for Hickson, Ward & Company is for less than that ? It is for 50 odd pounds, I think, whereas the statement attached is for £113 19s. 6d. ?

A. I think I told the committee the last time that I had verified all these payments in Hickson, Ward & Company's office in London.

Q. But will you explain the documents you now have in your hands. There are three papers tied together—one is an account to Hickson, Ward & Company, another is in somebody's handwriting, without any heading, and the third is typewritten at the top. I do not understand that, can you explain it ?

A. It is a receipt from Hickson, Ward & Company.

Q. For how much ?

A. For £113 19s. 6d.

Q. Whose handwriting is this attached to the account of Hickson, Ward & Co. ?

A. It looks like Mr. Smart's.

Q. Mr. Smart's handwriting ? And from where did the statement on top of that, the typewritten statement, come or is it the same thing ?

A. It was attached to the accounts when they were received in the department.

Q. What is the date of the account ?

A. The payment was made June 27, 1905.

Q. I do not understand that document, Mr. Beddoe ? There is an account from Hickson, Ward & Company. Over that account is a statement which you say is in the handwriting of Mr. Smart, and over that is a typewritten statement ?

A. Yes.

Q. Do you say that account was paid by the North Atlantic Trading Company ?

A. I say that account was paid.

Mr. JACKSON (Selkirk).—Would it not be advisable to have the statement read ?

The WITNESS.—This is an account for £113 19s. 6d. for the printing of 50,000

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German papers called 'Canada,' 50,000 wrappers and application forms, and 5,000 'Letters from Clergymen.' The account was rendered by Hickson, Ward & Company, London, England, and paid June 27, 1905.

By Mr. Monk :

Q. To whom was the account rendered ?

A. The account would be rendered to the Farmers' Auxiliary Association, in London, England, through whom all this German printing was done; that is, they gave the order for it.

Q. By whom was that account paid ?

A. It was paid by the North Atlantic Trading Company. The cheque was sent from Amsterdam to the Farmers' Auxiliary Association, London, to enable them to pay the account of Hickson, Ward & Company, and they did pay it. I verified that payment in Hickson, Ward & Company's own office.

By Mr. Jackson (Selkirk):

Q. There is something on it by Mr. Smart ?

A. There is a little writing here, but it is nothing. It is on the typewritten account : 50,000 German papers, 'Canada,' 50,000 wrappers and application forms, 5,000, 'Letters from Clergymen' £113 19s. 6d.'

By Mr. Blain :

Q. Why is that part of the account that is in Mr. Smart's handwriting there ?

A. I do not know why it is there, it has nothing to do with the account at all.

Q. Is Mr. Smart's handwriting part of the account which you have just read ?

A. No, the account proper is on Hickson, Ward & Company's own billhead.

Q. I am not asking that question. I am asking you if the account you have read is in Mr. Smart's handwriting ?

A. Yes.

By Mr. Miller :

Q. I understand it is duplicated; once in typewriting and once in Mr. Smart's writing ?

A. Yes, but there is no necessity for either because there is a billhead of Hickson, Ward & Company duly receipted, which I verified myself in London, England.

By Mr. Blain:

Q. Was Mr. Smart in the employ of the Department of the Interior at that time ?

A. He was not in the employ of the department on June 27, 1905; he left on January 1, 1905.

Q. How many months afterwards ?

A. That would be six months afterwards.

By Mr. Monk:

Q. How does he come to be in this transaction at all ?

A. I do not know.

Q. By whom was that voucher handed to you ?

A. I received it from the Immigration Branch of the Department of the Interior.

Q. You received it from the Immigration Branch, when ?

A. Just before I went to the old countries to audit these accounts.

Q. Then it was not a voucher you picked up in Amsterdam ?

A. No.

Q. Did that account go through the books of the North Atlantic Trading Company ?

A. The payment to the Farmers' Auxiliary Association went through—I cannot say for certain whether it was paid in two accounts, or one, to Mr. Leopold. I think

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it was in two payments if I remember right—but anyway it was in the books of the North Atlantic Trading Company.

Q. Can you state positively that this special amount of £113 went through the books of the North Atlantic Trading Company, that you saw it in Amsterdam?

A. I saw it in Amsterdam and verified it by their books.

Q. How did the voucher come to be here?

A. All the vouchers were here, Mr. Monk. They rendered a statement of every item of expenditure connected with the \$15,000 spoken of in the contract and that was one of the vouchers they had sent to the department.

By Mr. Wright (Renfrew):

Q. I would like to ask something about this Farmers' Auxiliary Association? What are they? Are they a printing firm or are they connected with the North Atlantic Trading Company?

A. They are practically the London agents of the company.

By Mr. Monk:

Q. Have they always been?

A. I could not say that. They have during the three years under discussion, from 1903, and I presume before that.

Q. When were they constituted agents of the North Atlantic Trading Company?

A. I do not know.

Q. Who was at the head of the Farmers' Auxiliary Association?

A. Mr. Leopold was at the head.

By Mr. Miller:

Q. The date of the payment from which that voucher was produced appears to be June, 1905?

A. June 27, 1905.

Q. And you say Mr. Smart left the employment of the department in January of the same year?

A. Yes.

Q. There is no date on that memorandum of Mr. Smart's, is there?

A. No, none at all.

Q. And naturally the order for that printing would have been given many months before payment was made?

A. Yes, some of it was given in October, 1904.

Q. While Mr. Smart was in the department.

A. Yes.

Q. Now, there is not anything to show you, or is there, as to why Mr. Smart made that memorandum or when he made it?

A. No, I cannot understand it.

Q. There is nothing to show that at all?

A. No.

Q. So it may have been made by Mr. Smart many months before the account was paid and while he was in the department?

A. I don't think so.

By Mr. Wilson (Lennox and Addington):

Q. Has this printing not got to be ordered by the North Atlantic Trading Company? Would they not order it themselves and submit it to the department for approval?

A. They did not always submit it to the department; they did some of it.

Q. It was part of the conditions?

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A. It was not obligatory. I think if you read the contract it does not force them to do it. If called upon to do it they would.

By Mr. Miller :

Q. Returning again to the Smart memorandum on the account, is there anything on the memorandum or have you any knowledge that would lead you to believe that was the way the memorandum was made up by Mr. Smart while he was still in the department or after he left ? You can have no information as to that ?

A. No, I have no information.

By Mr. Blain :

Q. You said a few minutes ago it was after Mr. Smart left the department ?

A. The account was paid after he left the department.

Q. Do you understand why Mr. Smart's memorandum is connected with this account at all ?

A. I have not the slightest idea.

Q. That is a part you do not understand ?

A. No.

By Mr. Wright (Renfrew):

Q. Is there no date on it whatever ?

A. There is no date.

By Mr. Blain :

Q. Why do you think it is attached ?

A. Why do I think it is attached ?

Q. Why do you think it should be there ? You say you do not understand it. You are an accountant, I understand, why do you think it is attached to this account at all ? What significance has it ?

A. I do not think it has any significance at all. I do not see why it is placed there, because Hickson, Ward & Company's billhead, with full particulars, receipted, is there ; unless it was, they wanted to make a duplicate for some reason.

Q. Mr. Smart is the gentleman who was formerly Deputy Minister of the Interior ?

A. Yes, he was Deputy Minister of the Interior.

Q. And the same gentleman who had to do with the making of the contract ?

A. Yes, the same gentleman.

By Mr. Wilson (Lennox and Addington):

Q. This is the shape you got it in, I suppose ?

A. Yes.

By Mr. Miller :

Q. I suppose under the systematic arrangements of the department, every scrap of paper that you have, connected with any transaction, is kept with the rest of the documents relating to that transaction ?

A. Yes, we generally do that.

By Mr. Monk :

Q. You referred a moment ago to a document in connection with the printing. Is that a memorandum made by you at the time ?

A. Which document ?

Q. That large sheet of paper you have ? Is it a memorandum made by you ?

A. It is a summary of the details on all the accounts.

By Mr. Carvell :

Q. Is it not a fact that in June, 1905, Mr. Smart was agent for the North Atlantic Trading Company in Canada ?

I. I think he was—if I have read the correspondence correctly—in May, 1905.

Q. Then in June he was the agent ?

A. Yes.

Q. After he became the agent of the North Atlantic Trading Company in Canada did any of the accounts and vouchers of the company pass through his hands ?

A. Not that I know of.

Q. You do not know then that anything came from the company to the department through Mr. Smart ?

A. I do not know that anything came.

By Mr. Blain :

Q. You do not know that they did not come through his hands ? Do you know anything about it ?

A. I do not know anything at all about it.

By Mr. Monk :

Q. Like my honourable friend Mr. Wright, I do not quite understand where the Farmers' Auxiliary comes in, in this matter. A large proportion of this printing during these three years seems to have been done in London ?

A. Yes.

Q. It was done under the orders of the Farmers' Auxiliary ? The accounts were rendered by the English printers to the Farmers' Auxiliary Association ?

A. Yes.

Q. And then, as I understand you, these accounts were paid from Amsterdam ?

A. Yes.

Q. You did not bring back any of the books of the North Atlantic Trading Company in which these entries were made ?

A. No, sir.

Q. Did you see the books of the Farmers' Auxiliary Association ?

A. I did ; they were in Amsterdam.

Q. The books of the Farmers' Auxiliary Association were in Amsterdam ?

A. I think I explained that to the committee. When I went to the office in London I found that Mr. Leopold had gone to Canada. On arriving at Amsterdam I reported that matter to the secretary and he said: 'That is all right ; all the books and papers necessary have been boxed up and sent over here.' So they were at my disposal to check.

Q. Now I understand you. The books of the Farmers' Auxiliary Association which, up to that time, had been in London, were sent over in a box, before you arrived in London, to the office of the North Atlantic Trading Company in Amsterdam ?

A. Yes.

Q. And that is what makes you say you saw these payments in the books of the North Atlantic Trading Company ?

A. Yes, in the books of the London office and the books of the Amsterdam office, of the North Atlantic Trading Company.

Q. Did these entries appear in the books of the Farmers' Auxiliary Association or in the books of the North Atlantic Trading Company ?

A. They appeared in the books of the North Atlantic Trading Company, the payments that had been made to the Farmers' Auxiliary Association.

Q. Then there were two sets of books, is that it ?

A. The head office at Amsterdam, of course, they have their set of books and Mr. Leopold kept an account of his transactions in London, England, also.

Q. Do I understand that you saw repeated in the books of the North Atlantic Trading Company—the books proper of that company in Amsterdam—the entries which were in the Farmers' Auxiliary Association's books which had been sent over from London to Amsterdam ; in other words double entries of these payments ?

A. No.

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Q. Exactly repeated from one set of books into the other set of books ?

A. No, for the purposes of my audit it was only sufficient for me to verify the entries in the books of the North Atlantic Trading Company to show that they had actually made these payments in connection with which they had rendered accounts to the department. I did that and went further than that; as far as I could I examined the correspondence bearing on each payment, and there was considerable correspondence too.

Q. Have you the correspondence with you bearing on this particular payment of £113 ?

A. No, I have no correspondence in connection with any of these amounts.

Q. Can you say that that payment of £113 sterling which is mentioned in Mr. Smart's memorandum was entered in the books of the Farmers' Auxiliary Association, and that a similar entry was to be found in the books of the North Atlantic Trading Company ?

A. I forget that, but still it was not necessary for the purposes of audit. It was in the books of the North Atlantic Trading Company, and when I got back to London I went to the office of Hickson, Ward & Company and put all the accounts before them and they were verified. I could not go further than that.

Q. Yes, but for the purpose of your audit I would like to know whether you found that payment of £113 sterling in the books of the Farmers' Auxiliary Association—or in the books which were sent over from London as you stated—and that you also saw it in the books of the North Atlantic Trading Company ?

A. I found it in the books of the North Atlantic Trading Company—it was shown there—but I cannot remember now whether I saw it in the books of the Farmers' Auxiliary Association, and it does not matter so much at all so far as the audit was concerned.

By Mr. Crawford :

Q. The payment went to the printing company ?

A. The payments went to the printing company and I verified them.

By Mr. Monk :

Q. Payment would be made by the North Atlantic Trading Company or through the Farmers' Auxiliary Association ?

A. Through the Farmers' Auxiliary Association.

Q. How do you know that ?

A. By the printing company. I went into that thoroughly ; I can swear to that.

Q. Then you are satisfied, from your visit to the printing company, that all these payments for printing were made by the Farmers' Auxiliary Association in the first place ?

A. I beg your pardon.

Q. You are satisfied, as far as you can be satisfied, from your visit to the printing company that they received their money from the Farmers' Auxiliary Association ?

A. Yes.

Q. They did not receive it direct from the North Atlantic Trading Company ?

A. No, sir.

Q. They got cheques, I presume, from the Farmers' Auxiliary Association ?

A. Yes, they were paid by cheques from the Farmers' Auxiliary Association.

Q. Then you say, the Farmers' Auxiliary Association would be reimbursed by the North Atlantic Trading Company ?

A. The North Atlantic Company would issue their cheque to the Farmers' Auxiliary Association and then it would be paid to Hickson, Ward & Company.

Q. What I would like to know, Mr. Beddoe, is this: When a printing account was incurred, was it paid and entered in the books of the North Atlantic Trading Company, or was it paid by the Farmers' Auxiliary Association and subsequently was there

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a settlement of accounts between the Farmers' Auxiliary Association and the North Atlantic Trading Company ?

A. I could not say at this moment, but I know all the accounts for printing were settled by the North Atlantic Trading Company by the issue of cheques to the Farmers' Auxiliary Association.

Q. Well, was there an issue of a cheque on the payment of each account, or was there a period of the year when the Farmers' Auxiliary Association would be recouped for its payments for printing by the North Atlantic Trading Company; in other words, would this item of £113 sterling be found first in the books of the Farmers' Auxiliary Association and afterwards in the books of the North Atlantic Trading Company ?

A. I could not say that now. All I know is that I verified the payments that were made to the Farmers' Auxiliary Association and I know that money was paid over to Hickson, Ward & Company.

Q. There never were, from what you say, any direct dealings between the North Atlantic Trading Company and Hickson, Ward & Company ?

A. No, sir.

Q. Who gave the orders, do you know, for this printing to Hickson, Ward & Company ? Who was the person ?

A. The secretary told me they always sent estimates of what printing they required and it was always considered thoroughly before they allowed their agent to give the order. Of course it was natural that they should keep the cost down as low as possible.

Q. I suppose the same system prevailed in 1905-6 ? Could you give the committee the proportion of printing that was done in England and the proportion that was done on the Continent out of what is mentioned in your report at page 6 for the printing of 1905-6 ?

A. Yes. Do you mean the volume of literature or the amount ?

Q. The volume of literature ?

A. On the Continent there were 275,000 pamphlets called 'Canada' printed.

Q. You might say where, at once, perhaps ?

A. That was in Hamburg.

Q. Then 300,000 covers for pamphlets ?

A. Hamburg, and 5,000 large Dutch pamphlets, 20 pages with map cover in two colours. That was in Hamburg.

Q. You have passed one, 173,500 agents' advertisements ?

A. Agents' advertisements printed on the back of the pamphlets. That was in Hamburg too.

Q. Who printed that ?

A. It was printed in Hamburg. 15,000 large Swedish pamphlets, 28 pages, with map cover, lithographed in two colours; 10,150 large Norwegian pamphlets, 32 pages, with map cover, lithographed in two colours.

Q. State where printed ?

A. All this was printed on the Continent.

Q. Yes, but where ?

A. In Hamburg. 100,000 maps, lithographed in three kinds, 75,000 in five colours and 25,000 in six colours.

Q. Printed where ?

A. At the same place, Hamburg, and at Budapest, in Hungary, there were a thousand Hungarian pamphlets printed.

Q. The cost of these, according to your report, seems to have been \$3,920.96 ?

A. That is for which year ?

Q. For 1905-6.

A. How much ?

Q. The cost of this printing for that year was \$3,920.96 ?

A. Yes, that is the total.

APPENDIX No. 4

Q. Now all this printing having been done in Hamburg, you have the vouchers ?

A. I have only copies of the vouchers for that year.

Q. Why have you not the original vouchers ?

A. The secretary of the company refused to give me the originals but he produced them and I verified them. His reason for not giving me the originals was that on account of the discussion in the different committees last session it was thought that there would be a great deal of trouble for these people who had been doing work for the North Atlantic Trading Company and he did not want the names to be made public.

Q. The secretary refused to show you the originals ?

A. He did show me the originals.

Q. He refused to give you the originals because from what occurred last year he thought there would be trouble ?

A. Yes.

Q. For whom ? The parties who had done the printing ?

A. Yes, the people who had done the printing. That is the reason that all the names of people who have done printing for the company should be kept private and as little publicity given to them as possible.

Q. Did he bind you to secrecy as to these printers as he did with respect to the agents of the company ?

A. He showed me the accounts receipted on the understanding that I would not divulge the names; that was it.

Q. You entered into that understanding ?

A. I did, sir, yes.

Q. This document which purports to be a copy of these vouchers is made out on the 30th June, 1906, as I see ?

A. Yes. That is the affidavit, is it ?

Q. This is a certificate of Mr. Cohen, dated Amsterdam, 30th June, 1906, in the following terms: 'I certify that this copy attached hereto is a true and correct copy of the general account for printed matter ordered and distributed by the company and the amount named has been paid to the printers. This printing consists of,' &c. &c. ?

A. Yes.

Q. This is dated June 30, 1906 ?

A. Yes.

Q. And you were in Amsterdam at what date ?

A. The end of November or the beginning of December.

Q. And he showed you that document ?

A. That had been furnished to the department.

Q. In fact you brought that over ?

A. Yes.

Q. Do you mean to say you compared these with the original accounts ?

A. I did, yes.

Q. But this is a statement in a thoroughly foreign language. Do you understand this language ?

A. We have the specimens of the pamphlets that were printed, and I have examined the book which they kept in regard to the distribution of this literature.

Q. I see an item on the 22nd June, 1905. Is that familiar to you ?

A. Which one is that ?

Q. At the top of the page. I give that as an instance of one of the items ?

A. It is on freight charges on literature.

Q. What language is that in ?

A. In German.

Q. Do you understand German ?

A. No, sir.

Q. Now this copy of a statement—because it is nothing else—is certified by Mr. Smart on July 25, 1906, at Amsterdam, in the following words : 'Having seen the

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original account representing the above expenditure, duly receipted by the printing house, I certify the above to be a correct copy of each item in said account. Jas. A. Smart.' At that time Mr. Smart was the Canadian agent of the North Atlantic Trading Company, was he not ?

A. Yes.

Q. And this document you took over to the other side from Canada ?

A. Yes.

By Mr. Wilson (Lennox and Addington):

Q. Had it that certificate on it ?

A. It had the certificate on it at the time. I might state that these vouchers were submitted to the Auditor General just in the shape that Mr. Monk has mentioned and he refused to take them. He said: 'Mr. Smart is no longer a member of the Department of the Interior, and before passing any more accounts for the North Atlantic Trading Company I would like a responsible officer of the department to go thoroughly into these matters in order that he may give the certificate.

Mr. WILSON.—I think he was quite right as a matter of policy, don't you ?

By Mr. Blain :

Q. You said you brought away a memorandum rather than the original accounts. Why did you not bring the original accounts ?

A. I think I stated to the committee, that during the inquiry last session in the different committees several names had been made public and it got to the ears of the officials at Amsterdam, and they felt that if it was announced publicly in the papers there, it would give trouble to all these people who were working for them.

Q. That was not my point. Did you receive instructions to secure the original accounts when you went over ?

A. No, my instructions were to audit the accounts..

Q. I understood you to say you desired to procure the original accounts but they would not give them to you. What I want to get at is, were you instructed to procure the original accounts when you went over ?

A. No, I did not have any instructions of that nature.

Q. Why did you ask for them ?

A. Because it would have been better if I could have brought all the original accounts back. At the same time when the secretary pointed out the difficulty I did not urge the matter at all; I satisfied myself that the expenditure had been made and the Auditor General would take my certificate on that.

Q. Were instructions given to you in writing when you went over ?

A. As to how I should proceed, do you mean ?

Q. What instructions had you when you were sent to examine these accounts ?

A. No instructions, except to carry out the wishes of the Auditor General.

Q. No written instructions whatever ?

A. Nothing, except a general letter of introduction to the officers of the North Atlantic Trading Company.

Q. No instructions whatever as to what you were to do ?

A. No, none whatever.

By Mr. Monk :

Q. Was any memorandum given to you ?

A. No memorandum.

Q. Who gave you that letter of introduction ?

A. My minister.

Q. Was it written by him ?

A. Written by his secretary.

Q. Was it a letter of the minister ?

A. It was just simply a letter of introduction to any of the officers of the North Atlantic Trading Company, while on my visit ; that is all.

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Q. You have a copy of that letter ?

A. I have not a copy of it. It was very short, but I can remember pretty well what the wording of it was.

Q. There is no copy of that letter extant ?

A. I don't know that there is. There was nothing in it.

Q. Nothing to indicate the subject of your mission, the extent of your powers, and the work you were to do ?

A. No, nothing at all. It was just a letter of introduction stating who I was and it was addressed to the officers of the North Atlantic Trading Company but no one in particular.

By Mr. Blain :

Q. And did you give it to one of them ?

A. I gave it to one of them and left it at Amsterdam.

Q. Would you make an effort to see if there is a copy in the department ?

A. I do not think there would be any objection to giving it to the committee ; of course I would not like to state offhand. There is nothing in it, as far as I can remember but what anybody could see.

Q. Did you go over with any definite instructions at all ? Who talked the matter over with you just before you went ?

A. It was the letter received from the Auditor General—received in the department—stating that he would not pass any more accounts until an audit had been made by an officer of the department ; that was really the whole thing.

By Mr. Monk :

Q. I think I must ask you, Mr. Beddoe, under the circumstances to give the committee the names of these printers to whom such large accounts appear to have been made for printing in 1904-5. I regret that you have taken that engagement not to reveal the names. You will understand as an accountant yourself, that an audit to be satisfactory to us must have that information.

By Mr. Carvell :

Q. Are the names on these accounts ?

A. No names.

By Mr. Barr (Dufferin) :

Q. It is very important that we should have this information otherwise we shall be in the dark ?

A. We have samples of the literature which was printed for which these accounts have been rendered.

By Mr. Blain :

Q. When you were asked to make a declaration that you would not divulge the names, did you do it without consulting your minister ?

A. I did not make a declaration.

Q. What did you do ?

A. I said I would like to see the original receipts. 'Well,' the secretary said, 'Mr. Beddoe, I cannot possibly show you those receipts unless you will promise faithfully that you will not divulge the names.' So I said all right.

Q. All this money was paid out of the treasury of Canada.

A. That is a mistake. Not one cent of this was paid out of the treasury.

Argument followed, Mr. Monk holding that the committee had a right to know the names of the printers in Europe to whom the North Atlantic Trading Company claimed to have paid money.

The WITNESS.—I think that I should be allowed to say a few words in justification of the work that I did. It really does not matter whether this name is divulged

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or given to the committee at all. I was asked to audit the books to see whether this company had paid out \$15,000—

Mr. MONK.—I have no objection at all to this witness arguing the point in this committee, but I think he is here as a witness.

Mr. CARVELL.—I think it is fair that the witness should state his reasons.

The Chairman ruled that the witness should be allowed to proceed.

The WITNESS.—I wish to be as respectful as I can to the members of the committee and place myself right with them. I have now been accustomed to figures for forty years and I think I went into the matter pretty thoroughly when I was in Europe. I anticipated that questions would be asked, probably in the Public Accounts committee or in this committee, and therefore I studied all sides of this question, although it is only a small matter the expenditure of \$15,000 a year. But when the secretary of the North Atlantic Trading Company asked me as a favour not to press for the production of this voucher, I said: 'I cannot audit the books thoroughly until I have seen that there is a receipted account from this paper that the money has been paid.' He produced it but would not give it to me; he only furnished a duplicate with a declaration that it was correct. After going over the figures for that year I found that instead of the \$15,000 which they were asked to expend, there was a sum of \$18,283.79 expended in 1905-6, or a surplus of \$3,283.79 over and above what was called for by the contract. The amount of the account in question, which they would not allow me to bring back with me, amounted to about \$2,200 so that eliminating that altogether there was still between one or two thousand dollars expended, over and above the \$15,000 called for by section 3 of the contract. We spoke of this and I said: 'Very well then, I won't press the matter and I will promise you that I won't reveal the name of this printer'

By Mr. McCraney :

Q. What was the reason given for the request of their secretary that this name should not be disclosed?

A. His reason was because the examination in the different committees here last session had been reported in some of the papers on the Continent. Some of these names had been mentioned in the committee by the witnesses, and they were afraid that they might get into very serious trouble.

Q. Where did this printer live?

A. In Hamburg.

By Mr. Bergeron :

Q. Did you understand by that that the government of Canada had made any illegal contract over there?

A. I did not, sir, because in the contract with the North Atlantic Trading Company there was a clause saying that they bound themselves not to infringe the laws of any of those countries.

Q. Then how do you account for this refusal to give the name under the circumstances?

A. They carried on their propaganda in their own peculiar manner, but it had to be kept very secret.

By Mr. Lake :

Q. Do I understand you to say that you only understand English?

A. Just English and a little French, that is all.

Q. The great majority of all these accounts, vouchers, and correspondence in connection with the vouchers were in languages you do not understand?

A. Yes.

Q. Did you have an interpreter with you?

A. There were three interpreters in the office.

Q. But they were in the employ of the North Atlantic Trading Company, I presume?

APPENDIX No. 4

A. Yes.

Q. You did not have an interpreter there in your own employ to translate these accounts for you ?

A. I did not.

Q. Therefore you had to take in trust what was told you by the officers of the company as to the meaning of these vouchers ?

A. I think, sir, even if you do not understand—I do not know if you do—the German language and you had a letter there acknowledging the receipt of certain payments, and some one who did understand the language read it over for you, your common intelligence would let you know it was absolutely correct, and that is the way I did.

Q. I must confess that you can follow two or three main words, but as to the meaning of the minor words it is rather difficult to be absolutely certain of the exact wording of any letter such as that ?

A. It was the figures I went more by.

By Mr. Burrows :

Q. Are you satisfied they interpreted this memorandum for you correctly or have you any suspicion that they were misleading you ?

A. I am absolutely satisfied they interpreted correctly.

By Mr. Lake :

Q. It did not occur to you in going into a lot of languages you did not understand, that you should have had an interpreter in your own employ to do the translation for you ?

A. I did not think it was necessary at all.

By Mr. Telford :

Q. Did you satisfy yourself that the printing was done ?

A. Yes, sir, I have copies of the printed material here with me now. I examined the distribution in the books in which they entered the date, the name of the consignee, and the quantity and description of the literature that was distributed, so that I was pretty well satisfied.

By Mr. Blain :

Q. Will you state to the committee from memory just what happened when you approached the accountant to look up the accounts ?

A. I don't quite understand.

Q. You approached the accountant to look over these accounts ?

A. Yes.

Q. Then will you state to the committee what happened and what was said when you approached him and afterwards ?

A. I presented to him my letter of introduction.

Q. Well ?

A. And produced the vouchers which you see here to-day and went over them. I examined the company's books and verified the entries there.

Q. Yes ?

A. And then to further verify it I asked him for correspondence, of which they had a large quantity.

Q. And after that was all done and you noticed that the amounts had been expended it was then he asked you not to divulge the name, was it ?

A. I had made up the amounts.

Q. I am asking you this question: I want to know, was it at the commencement or close of your conversation that he requested you not to divulge the name ?

A. At the close.

Q. I asked you to tell the committee what happened. You have told us down to

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a certain point. Now, I want to know if it was at the close or commencement of your conversation that he asked you not divulge the name ?

A. It was when I was examining the accounts for 1905-6.

Q. You had access to the books and it was after that ?

A. Yes.

Q. While you were going through the accounts ?

A. While I was going through the accounts. I knew actually what had been expended from the account that had been rendered before—the total.

Q. Then he did not say that to you at the same time, it was after you were going through his books ?

A. After, yes.

By Mr. Monk :

Q. Why did you not bring back the books of the Farmers' Auxiliary Association ?

A. I could not.

Q. Did you ask for them ?

A. I did not.

Q. Is that Farmers' Auxiliary dissolved to-day ?

A. I could not say ; I don't know anything about it.

Q. Were the books, after your visit, returned from Amsterdam to London ?

A. I could not say that, I presume they must have been.

Q. But they were all in Amsterdam while you were there ?

A. All in Amsterdam.

Q. Now, referring to the expenditure for advertising amounting to \$14,472.08, as set out at page 7 of your report, who are the parties to whom this money was paid ?

A. That is the total for the three years 1903-4, 1904-5, 1905-6, is it not ?

Q. Yes, sir.

A. Street & Co., of London, England, were paid a considerable amount for all the advertising in Germany, Luxemburg and Switzerland.

Q. About what proportion of these 14,000 odd dollars were paid to Street & Co. ?

A. I have not those figures before me, but I can make it up.

Q. Have you the vouchers for Street & Co. ?

A. Oh, yes, I have the vouchers for everything.

Q. Would you let me see Street & Co.'s vouchers ?

A. Yes. (Produces vouchers.)

Q. Am I right in saying that the advertising account of Street & Co. for 1903-4 was £20-10-8 sterling ?

A. It is £41 8s. 10 altogether.

Q. It does not seem to have receipted ?

A. There were two accounts for advertisements in newspapers in Switzerland.

Q. But this is a very small portion of the advertising for 1903-4 ?

A. Yes.

Q. Who received the balance ?

A. Der Monats Kalandar, for advertising in Austro-Hungarian papers for five months. That is quite a considerable sum there.

Q. Have you that voucher ?

A. Here it is (produces voucher). These are the receipts.

Q. Have you any receipts for rent, and travelling expenses ?

A. Yes.

Q. Allowances to agents for conducting propaganda, commissions to agents ?

A. Yes, sir, I have all these vouchers for rent and everything.

Q. Show me some vouchers for rent ?

A. Travelling expenses also and all the things you mentioned.

At this stage Mr. Monk moved, seconded by Dr. Barr, that the witness be ordered to give the names of the printers referred to in his depositions which he had declined to furnish to the committee. Upon a division the motion was declared lost.

APPENDIX No. 4

By Mr. Miller :

Q. You have been in the department some twenty-five years and are now chief accountant.

A. Since 1883.

Q. You were then in the Department of Interior at the time of the late Conservative government when Sir Charles Tupper was premier ? I want to ask you whether the emigration work in European countries in which the North Atlantic Trading Company has been operating was not in the old days, under the Conservative régime, carried on with the same system of secrecy which has prevailed during the last few years under the North Atlantic Trading Company.

Mr. WILSON (Lennox and Addington).—I rise to a point of order. There is not only the doubt as to whether that is a fair question, but at that time, if I remember right, the emigration work was under the Department of Agriculture.

By Mr. Miller :

Q. Have you any knowledge as to the manner in which emigration was carried on from these particular countries of Europe in the days of the Conservative régime ?

A. I always understood that the continental emigration had to be kept pretty secret.

By Mr. Wilson (Lennox and Addington):

Q. Do you know that ?

A. Yes, I know that because it has continually come to my notice through correspondence, and it is on record in the department too.

Q. Do I understand then that from the correspondence you have examined, and from the records of the department, you are convinced and assured that the same system of secrecy was in vogue in the days of the Conservative government that is in vogue to-day ?

A. I think in the discussion in the House last session that was brought out pretty strongly by some member, I forget who it was. There were letters read in the House were there not ?

Mr. MONK.—Yes ; it has been a custom for a long time.

The WITNESS.—In writing to the department he always, or as a rule, made private reports in connection with the continental emigration.

By Mr. Miller :

Q. Who did ?

A. Sir Charles Tupper.

Mr. MILLER.—The witness says that Sir Charles Tupper always made a private report.

The WITNESS.—Not always.

By Mr. Blain :

Q. How do you know Sir Charles Tupper made a private report ?

A. It is stated in the blue books of the Department of Agriculture.

Q. Were you in the department at that time ?

A. No.

Q. You had no opportunity of knowing ?

A. But I looked into this matter of emigration for my own private satisfaction.

By Mr. Miller :

Q. You have the knowledge from the reports you have read in the blue book ?

Q. Yes, and also from the correspondence in the Department of Interior.

Q. You have said that the officers of the North Atlantic Trading Company were very much afraid that publicity would get their agents into trouble—the divulging of their names ?

A. Yes.

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Q. I understand these agents were largely, originally, the booking agents of the steamship companies ?

A. Yes.

Q. Have you any knowledge, or have you heard anything, of these steamship lines getting into trouble from prosecuting European emigration to Canada ?

A. Yes, only last winter when I was over there, I saw in the newspapers, I think it was at Budapest, the government was in session and it came to their knowledge that the Cunard Line had been conducting a pretty aggressive propaganda and they were ordered to close up their office there.

Q. Now, Mr. Leopold's name has been before the committee as a man, who in England, was doing a considerable work for the North Atlantic Trading Company, and I think that some effort has been made to rather throw reflections upon the work and name of Leopold. I have seen it stated in the papers that Leopold is in the employ of the Manufacturers' Association of Canada to bring artisans, or encourage the emigration of artisans, from European countries to Canada. Do you know whether that is correct or not ?

A. I don't know anything about that.

Q. In a speech delivered in the House last session on the North Atlantic Trading Company, Mr. Foster rather endeavoured to lead us to believe that Mr. Sifton, Mr. Smart and Mr. Preston were making money, and had made money, out of the transactions of the North Atlantic Trading Company. I want to know whether you, from the knowledge you have gained in the department, from the knowledge you gained whilst making your visit to London and on the continent—whether from the knowledge you have obtained regarding emigration work, have discovered anything to lead you to believe or to suspect that either Mr. Sifton, Mr. Preston or Mr. Smart have derived any benefit whatever from these transactions of the North Atlantic Trading Company ?

A. No, I never saw anything.

By Mr. Blain :

Q. Do you know whether they did or did not ?

A. I don't know anything about it. I never saw anything to lead me to suspect that they ever derived anything from the profits of the North Atlantic Trading Company.

Q. You don't know anything about it ?

A. I never saw anything to cause me to suspect they did, and I don't think they did.

The witness was discharged.

Having examined the preceding transcript of my evidence of March 20, 1907, I find it correct.

CHAS. H. BEDDOE,
Accountant of the Department of the Interior.

APPENDIX
TO THE
PRECEDING REPORT

RESOLUTIONS ADOPTED BY THE COMMITTEE.

The following resolutions were adopted by the Committee as recommendations for the promotion of the agricultural and industrial interests of the Dominion:—

No. 1.—ORGANIZATION—ELECTION OF A CHAIRMAN.

The Select Standing Committee on Agriculture and Colonization having met this day for organization, it was moved by Mr. Calvert, seconded by Mr. McIntyre (Strathcona)—‘That Mr. McKenzie be Chairman of this Committee, for the current session of parliament.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, December 12, 1906.

No. 2.—TO EMPLOY A SHORTHAND WRITER.

Moved by Mr. Derbyshire,

Seconded by Mr. Wright (Renfrew)—‘That the Committee ask authority from the House to employ a shorthand writer, to take down such evidence as they may deem proper.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, December 12, 1906.

No. 3.—RESOLUTION ON PUBLIC SERVICES OF MR. JOHN MACOUN.

Moved by Mr. Derbyshire,

Seconded by Mr. Wright (Renfrew)—‘That the thanks of this Committee be now tendered Mr. John Macoun, Naturalist to the Geological Survey Department, of Canada, for the valuable information laid by him before the Committee on the natural capabilities of that large section of Western Canada extending from Edmonton to Portage la Prairie, on the occasion of his appearance before us, on this subject.’

The Committee desire also, to record their appreciation of the valuable services Mr. Macoun has rendered to Canada in the past thirty years of his arduous official services as a practical science officer of the Geological Survey of the Dominion, notable among which are the following explorations of territory: Professor Macoun’s first trip across the prairies was with Sir Sandford Fleming in 1872. His glowing report of the country traversed, caused him to be sent again in 1875 to explore the route that it was then intended that the Canadian Pacific would follow. When the present route was decided upon, the government sent him in 1879, 1880 and 1881, to report upon the country that would be opened up by the railway. Optimistic as his reports and prophecies were, they have all proved true.

To these are to be added Prof. Macoun’s explorations in the Canadian Yukon Territory, in 1903, which revealed for the first time that, that far northern division of Canada also possesses agricultural resources of no mean order.—Motion cordially adopted.

COMMITTEE ROOM 34,

WEDNESDAY, January 23, 1907.

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No. 4.—THE PRINTING OF EVIDENCE.

Mr. Derbyshire moved,

Seconded by Mr. McIntyre (Strathcona)—1. 'That the Committee recommend that 20,000 copies of the evidence of Mr. John Macoun, F.L.S., F.R.S.C., Naturalist to the Geological Survey, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, in the usual numerical proportions of English and French, as advance sheets of the Committee's Final Report, for distribution as follows: 17,800 copies to members of parliament; 1,000 copies to the Department of Interior; 1,000 copies to Department of Agriculture, and 200 copies to the use of the Committee.

2. 'And also that 20,000 copies of the evidence of Mr. Elihu Stewart, Superintendent of Dominion Forestry, taken by the Committee in the current session of parliament, be printed in pamphlet form as advance sheets of the Committee's Final Report, and distributed precisely as described in preceding section No. 1, in the case of the evidence of Mr. John Macoun.'—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, February 6, 1907.

No. 5.—PRINTING EVIDENCE.

Moved by Mr. Derbyshire,

Seconded by Mr. Wright (Renfrew)—1. 'That the Committee recommend to the House that 20,000 copies of the evidence of Mr. J. A. Ruddick, Dairy Commissioner, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for distribution as follows: 16,900 to members of parliament; 3,000 to the Department of Agriculture, and 100 copies to the use of the Committee.

2. 'Also that 20,000 copies of the evidence of each of the following: Dr. W. Saunders, Director of Experimental Farms; G. H. Clark, Seed Commissioner, and Dr. Charles Saunders, Cerealist, taken by the Committee, in the current session of parliament, be printed, forthwith, in the usual numerical proportions of English and French, and in each case be distributed in the exact manner and numbers as described in the first above section.'—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, February 27, 1907.

No. 6.—TO SUMMON MR. BEDDOE, TO GIVE EVIDENCE.

Moved by Mr. Monk,

Seconded by Mr. Blain—'That Mr. Beddoe, Accountant of the Department of the Interior, be ordered to appear before the Committee at its next meeting.'—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, March 6, 1907.

No. 7.—TO PRINT EVIDENCE OF DR. FLETCHER.

Moved by Mr. Clements,

Seconded by Mr. Black—'That 40,000 copies of the evidence of Dr. Fletcher, heard by the Committee in session to-day, be printed for circulation.'—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, March 6, 1907.

APPENDIX No. 4

No. 8.—TO REPORT EVIDENCE TO THE HOUSE.

Moved by Mr. Monk,

Seconded by Mr. Blain—‘That the evidence of Mr. Beddoe, be reported, forthwith, to the House, and that the witness (Mr. Beddoe) be now discharged.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, March 20, 1907.

No. 9.—TO PRINT EVIDENCE OF MR. F. CHARLAN.

Moved by Mr. Monk,

Seconded by Mr. Dugas—‘That 20,000 copies of the evidence of Mr. Charlan, taken by the Committee now in session, be printed, forthwith, in pamphlet form, for circulation.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, March 27, 1907.

No. 10.—TO PRINT EVIDENCE OF PRINCIPAL J. W. ROBERTSON.

Moved by Mr. Derbyshire,

Seconded by Mr. Wright (Renfrew)—‘That 40,000 copies of the evidence of Principal J. W. Robertson, taken by the Committee now in session, be printed, forthwith, in the usual numerical proportions of English and French, for distribution.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, April 3, 1907.

No. 11.—THANKS OF COMMITTEE TENDERED TO PRINCIPAL J. W. ROBERTSON.

Moved by Mr. Sproule,

Seconded by Mr. Wright (Muskoka)—‘That the cordial thanks of the Committee be now tendered to Principal Robertson for the highly instructive address with which he has furnished them at their meeting of this day.’—Motion adopted.

COMMITTEE ROOM 34,

WEDNESDAY, April 3, 1907.

No. 12.—THANKS OF COMMITTEE TENDERED TO CHAIRMAN.

Moved by Mr. Derbyshire,

Seconded by Mr. Wright (Renfrew)—‘That the thanks of the Committee be tendered to Mr. McKenzie, for the marked ability and courteousness with which he has conducted the investigations of the Committee, throughout the current session of parliament.’—Motion cordially adopted.

COMMITTEE ROOM 34,

THURSDAY, April 25, 1907.

INTERIM REPORTS.

FIRST REPORT.

The Select Standing Committee on Agriculture and Colonization present their First Report, as follows:—

The Committee recommend that they be granted leave by the House to employ a shorthand writer to take down such evidence as they may deem proper.

P. H. McKENZIE,
Chairman.

HOUSE OF COMMONS,
December 13, 1906.

Concurred in by the House, December 13.

SECOND REPORT.

The Select Standing Committee on Agriculture and Colonization present their Second Report, as follows:—

The Committee recommend that 20,000 copies of the evidence of Mr. John Macoun, F.L.S., F.R.S.C., Naturalist to the Geological Survey, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, in the usual numerical proportions of English and French, as advance sheets of the Committee's Final Report, for distribution as follows: 17,800 copies to members of parliament; 1,000 copies to the Department of Interior; 1,000 copies to the Department of Agriculture, and 200 copies to the use of the Committee.

2. And also that 20,000 copies of the evidence of Mr. Elihu Stewart, Superintendent of Dominion Forestry, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, in the usual numerical proportions of English and French, as advance sheets of the Committee's Final Report, and distributed precisely as described in preceding section No. 1, in the case of the evidence of Mr. John Macoun.

HOUSE OF COMMONS,
February 6, 1907.

Concurred in by the House, February 7.

THIRD REPORT.

The Select Standing Committee on Agriculture and Colonization present their Third Report, as follows:—

1. The Committee recommend that 20,000 copies of the evidence of Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for distribution, as follows: 16,900 to members of parliament, and 3,000 to the Department of Agriculture, and 100 copies to the use of the Committee.

2. That 20,000 copies of the evidence of each of the following witnesses, taken by the Committee in the current session of parliament, viz.: those of G. H. Clarke,

APPENDIX No. 4

Seed Commissioner; Dr. C. E. Saunders, Experimentalist, and of Dr. W. Saunders, Director of Dominion Experimental Farms, be printed, forthwith, in separate pamphlet forms, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, and in each case to be distributed in exact manner and numbers as directed in section 1 of this Report.

HOUSE OF COMMONS,
March 1, 1907.

Concurred in by the House, March 4.

FOURTH REPORT.

The Select Standing Committee on Agriculture and Colonization present their Fourth Report.

1. The Committee recommend that 20,000 copies of the evidence of Mr. A. McNeil, Chief of the Fruit Division, Department of Agriculture, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for distribution, as follows: 16,900 to members of parliament, 3,000 to the Department of Agriculture, and 100 copies to the use of the Committee.

2. That 40,000 copies of the evidence of Dr. James Fletcher, Dominion Entomologist and Botanist, taken before the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for distribution, as follows: 35,900 to members of parliament, 3,000 to the Department of Agriculture, 1,000 to the witness, and 100 to the use of the Committee.

HOUSE OF COMMONS,
March 21, 1907.

Concurred in by the House, March 22.

FIFTH REPORT.

The Select Standing Committee on Agriculture and Colonization present their Fifth Report.

The Committee submit herewith, for the information of the House, the evidence of Mr. C. H. Beddoe, Accountant of the Department of Interior, upon his findings on his personal examination in Europe of the books and accounts of the expenditure of the North Atlantic Trading Company, upon immigration to Canada, for the years ending 30 June, 1903, to 30 June, 1906, inclusive.

HOUSE OF COMMONS,
March 27, 1907.

SIXTH REPORT.

The Select Standing Committee on Agriculture and Colonization present their Sixth Report, as follows:—

1. The Committee recommend that 20,000 copies of the evidence of Mr. F. Charlan, of the Department of Agriculture, taken by the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for

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distribution as follows: 16,900 to members of parliament, 3,000 to the Department of Agriculture, and 100 to the use of the Committee.

2. That 40,000 copies of the evidence of Dr. J. W. Robertson, Principal of the Macdonald College of Agriculture, at Ste. Anne de Bellevue, Quebec, taken before the Committee in the current session of parliament, be printed in pamphlet form, forthwith, as advance sheets of the Committee's Final Report, in the usual numerical proportions of English and French, for distribution as follows: 34,900 copies to members of parliament, 3,000 to the Department of Agriculture, 2,000 to the witness, and 100 to the use of the Committee.

HOUSE OF COMMONS,

April 5, 1907.

Concurred in by the House, April 9.



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